IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication JUNE 23, 1960

The Second Half Outlook for Capital Spending

Steel Industry Starts

Overall Metalworking HOLDS UP

A Special Report on Metalworking Capital Appropriations p. 73

How Castro Undermines U.S. Business in South America p. 61

Tape Controls Save on Small Lots p. 105

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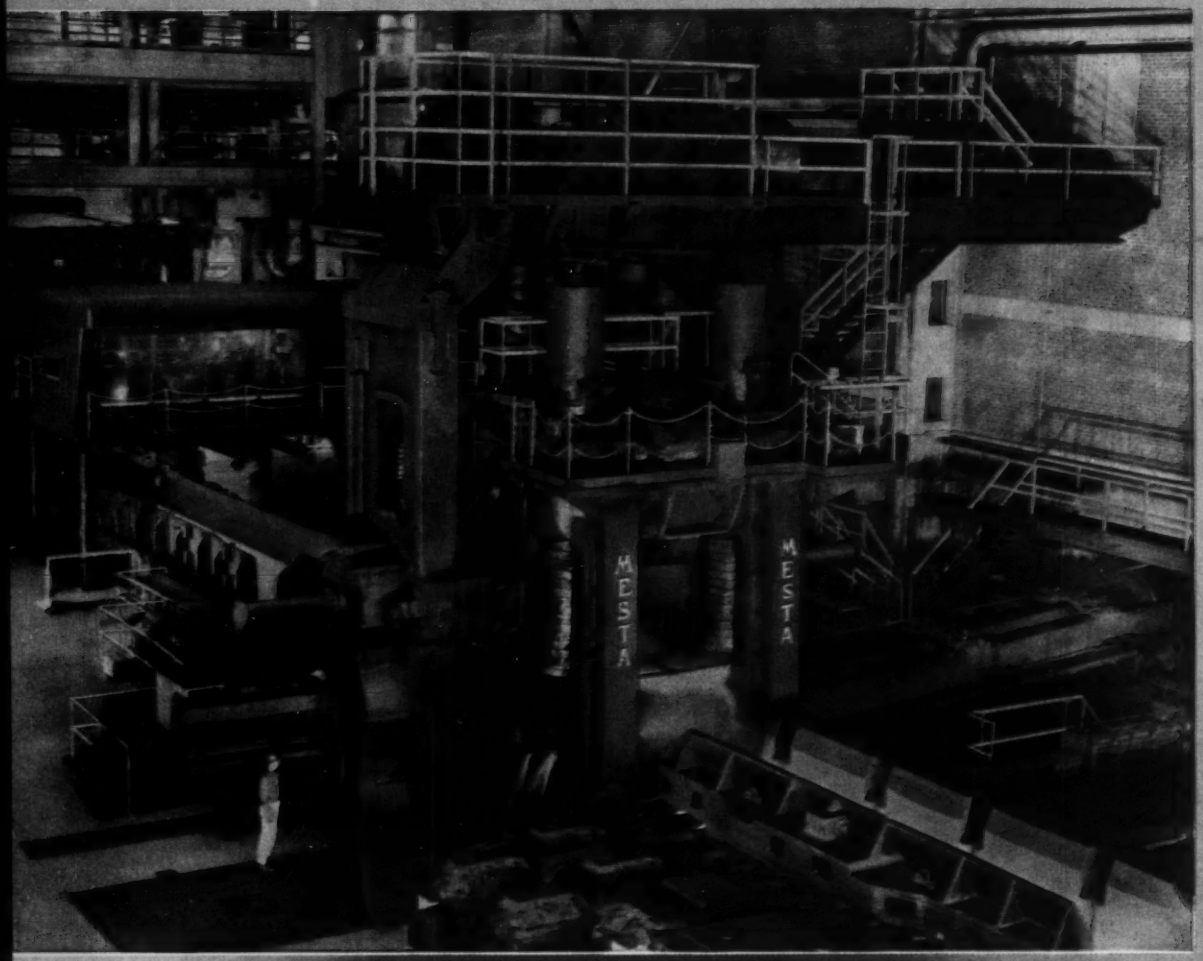
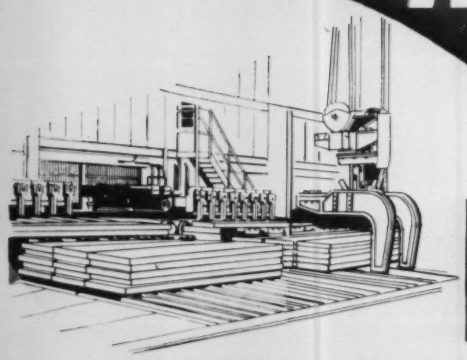


Rolling Ingots into Slabs on a
MESTA Universal Reversing Slabbing Mill

SLABBING MILLS

Designed and Built by MESTA



Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

Tool Steel Topics

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

Another report on Lehigh H tool steel—
"good machinability . . . very low distortion"

7-STAGE DIE FORMS AUTOMOTIVE DECK HINGE PART

This 7-position progressive die of Bethlehem Lehigh H tool steel was made recently by Hillside Tool & Die Company, Roseville, Michigan, for the production of an automotive deck hinge part, from 13-gage sheet steel. The die, made from Lehigh H supplied by our local distributor, Peninsular Steel Co., Detroit, was hardened to Rockwell C 60. It was used in a 400-ton press.

When asked about the performance of the tool steel, a Hillside engineer reported, "We like Lehigh H in jobs of this type because of its good machinability, and its very low distortion during heat-treatment. The die was placed in service with hardly any stoning necessary."

Bethlehem Lehigh H (AISI D-2) is our easy-machining, high-carbon, high-chrome grade of air-hardening tool steel. It has outstanding wear-resistance, due to its excellent carbide distribution.

Your Bethlehem tool steel distributor can give you full details on Lehigh H . . . and he has many sizes in stock.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

Here's how to shrink-fit tool inserts

Shrink-fitting of tool steel inserts, commonly used in improving the service life of tools, is most applicable to rings and cylinders used in heading and drawing operations, where the tools can be shrink-fitted into large retaining rings. The shrink-fit sets up radial compressive stress in the tool. This serves to oppose radial tensile stress set up in service, thereby improving the performance over solid tools which are not pre-stressed.

Here's how to do it:

1. The retainer should have adequate diameter and strength to provide the stresses required on the tool insert. Generally, an alloy steel capable of hardening to 300-400 BHN is used. Shock-resisting tool steels, heat-treated to Rockwell C 48-52, are recommended for heavy-duty applications. The OD of the retainer should be at least twice, and preferably three times, the ID.

2. Allow for a shrink-fit of .003/.004 in. per in. Thus the OD of the insert is .003/.004 in. per in. larger than the ID of the retainer into which it is to fit. These dimensions must be maintained to obtain the benefits of shrink-fitting.

3. It is important that the OD of the insert and the ID of the retainer have a smooth finish, preferably produced by grinding.

4. Heat the retainer to a temperature sufficient to cause the expansion required in assembling the insert. Do not exceed the tempering temperature used in heat-treating the retainer. If necessary, the insert may be sub-zero cooled, to help provide the proper clearance for assembly.

5. After assembly of the parts, the assembly should be cooled rapidly. This will prevent over-tempering of the insert by heat transferred from the retainer.

THE IRON AGE
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The IRON AGE

June 23, 1960—Vol. 185, No. 25

Digest of the Week in

★Starred items are digested at right.

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News of the Industry

TROUBLE IN CUBA

Watch and Wait — U. S. companies in Cuba have no choice but

to try to wait it out. Meanwhile, Castro's propaganda spreads anti-U. S. sentiment throughout Latin and South America. P. 61

ORE SHIPMENTS CUT

Reflects Slow Steel Sales — Already some Great Lakes ore boats are calling it a season. The cut back in shipments reflects the downturn in steel sales. P. 63

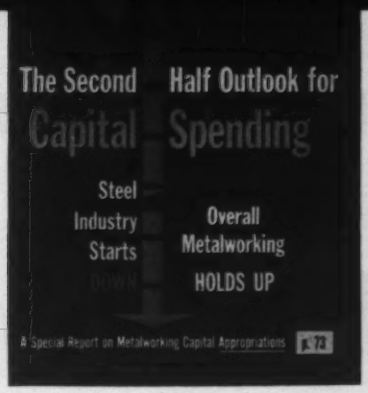
BRITISH STEELMAKERS

Tell Industry Plans — Britain's steel industry faces some world marketing problems. But with a record steel production year in sight, it plans to boost capacity over the next 5 years. P. 64

ATOMIC REACTORS

Industry Still Interested — Far from lagging, industrial interest in atomic power and isotopes is gain-

Metalworking


The Second Half Outlook for
Capital Spending
Steel Industry Starts
Overall Metalworking HOLDS UP
A Special Report on Metalworking Capital Appropriations P-73

Cover Feature

CAPITAL SPENDING — The second of the IRON AGE's 1960 series on metalworking's capital appropriations shows: Most areas of metalworking will spend more this year. But plans of the steel industry indicate a slowdown. P. 73

ing ground. Building reactors is a big business. P. 65

PANIC SPENDING

May Be Dangerous—Budget director warns that panic spending as a result of international tensions can threaten stability. And results are questionable. P. 87

Engineering-Production Developments

TAPE-CONTROLLED DRILL

On Small Job Lots—A tape-controlled positioning table and radial drill is handling the manufacture of precision machines in both short and fairly long runs. The setup satisfies two needs: It places holes accurately and quickly and it provides these functions with a minimum of tool cost. P. 105

SCRAP RECOVERY

Of Reactive Metal—A new vacuum melting furnace, primarily intended for titanium scrap recovery, combines the unique features of skull melting by permanent electrode with vacuum melting by consumable electrode. The furnace improves operating safety for melting and casting reactive metals. P. 108

ACID-BESSEMER STEEL

Better Quality—Since 1861, U. S. steelmakers have employed the acid process in bottom-blown converters. This process is constantly being improved. Result: increased production efficiency and higher quality steels. Here are some of the latest developments. P. 110

PURE REFRACTORY METAL

From Large Crystals — Refractory metals have great industrial potential. But it hasn't been realized yet. Single crystals may be the answer. They're formed and worked at lower heats than the normal refractory group. P. 114

FLATTENING MILL

Accent on Speed — High-carbon steel strip is in great demand. But foreign producers maintain a sizable share of the domestic market. An American company now expects to offer stiff competition with its new flattening mill. P. 116

Market and Price Trends

AUTOMOTIVE

Chevy's Aluminum Engines — For the first time since starting production of its aluminum engine, Chevrolet has let outsiders inside its new facilities. P. 83

MACHINE TOOL

Precision Honing — Centerless machine may help solve the problem of finishing batch lots of small parts without the need for a battery of special machines or special methods. P. 91

WEST COAST

Aerospace Labor Pact—Contract settlement between UAW and North American Aviation may set pattern for the industry. P. 89

STEEL SUMMARY

Slow Summer—Steelmakers have written off July. Some improvement in August is expected as first deliveries are made of steel for 1961 models. Export is helping hold up sheet market. P. 145

PURCHASING

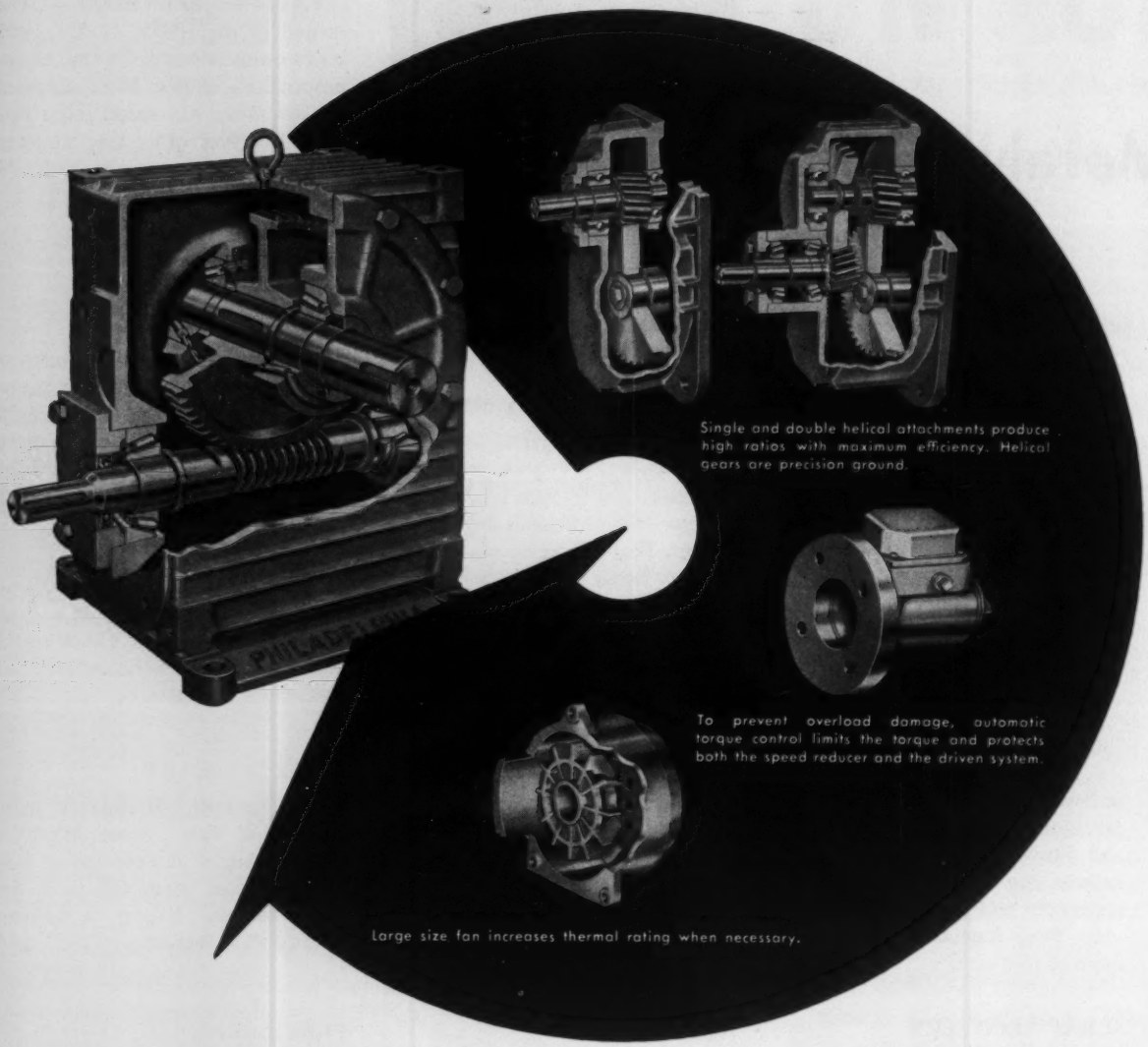
The Golden Rule — Purchasing should be in the mutual interest of both the buyer and the seller, says W. A. Ehresman, director of purchases, the Budd Co. P. 146

NEXT WEEK

PRECOATED METALS

Guide to Profits — Precoated metals will be the subject of next week's award-winning series, "How to Get More for Your Metalworking Dollar." This article will show how industry can use these materials to economic advantage.

Want higher worm gear efficiency?


Single and double helical attachments produce high ratios with maximum efficiency. Helical gears are precision ground.
To prevent overload damage, automatic torque control limits the torque and protects both the speed reducer and the driven system.
Large size fan increases thermal rating when necessary.

THEN HERE IT IS... FROM PHILADELPHIA

Here's new high efficiency in heavy duty worm gear drives that has never been available before. Helical attachments for double and triple reduction units combine the efficiency advantage of helical gearing with the high ratio advantage of worm gearing. You save on power... operating temperatures are lower... gearing lasts longer.

New high capacity, too. Improved tooth forms, precision ground alloy steel worms, special high strength bronze gears, heavy duty housings, precision ground helical gearing ... all add up to higher capacity in less space. In many instances you can save up to 50% in space, 40% in weight.

Delivery from stock of any drive arrangement and any mounting arrangement. Ratios from 5⅛:1 to 6150:1. Center distances: 3 in. to 21 in. Torque control attachments are also available from stock. For complete data, write for catalog WG-60.

philadelphia gear drives

PHILADELPHIA GEAR CORPORATION

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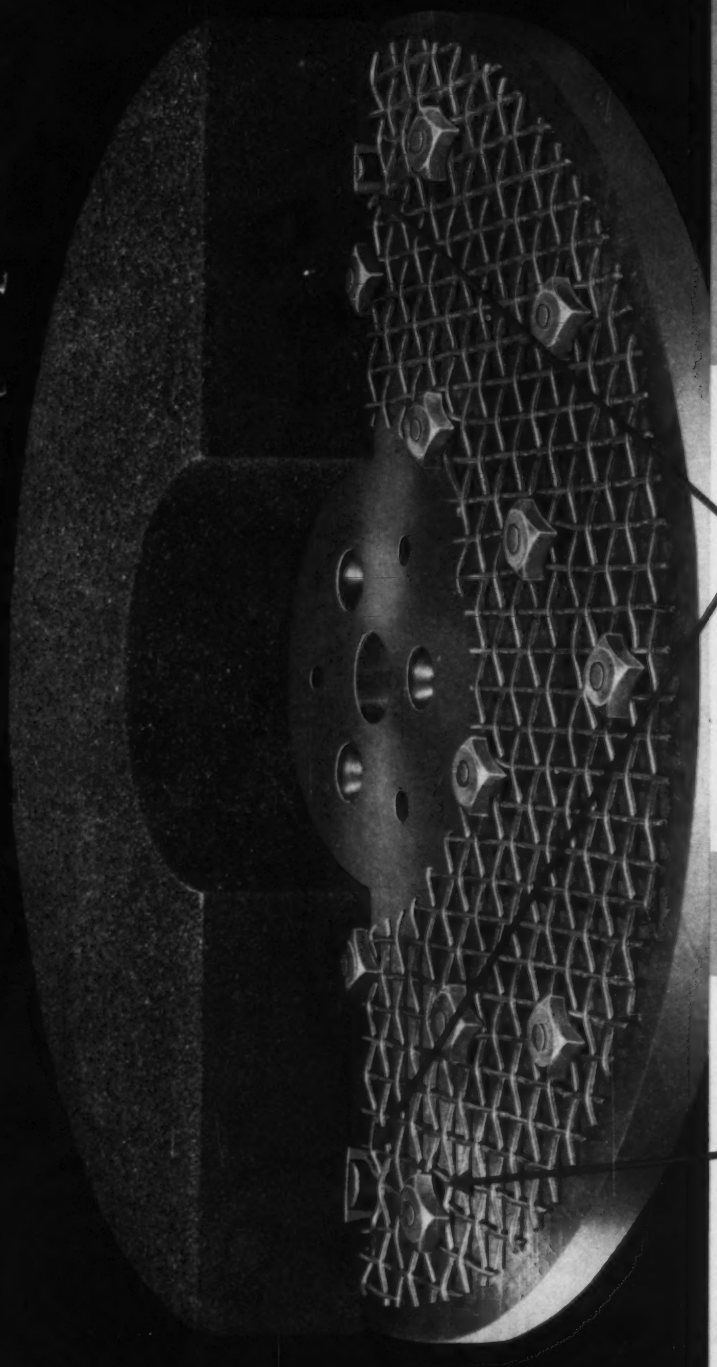
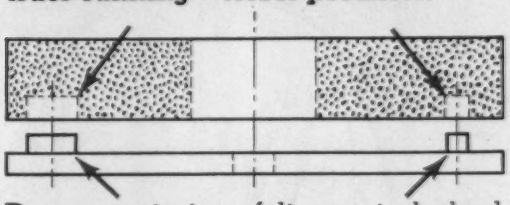
Offices in all Principal Cities • Virginia Gear & Machine Corp., Lynchburg, Va.

INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID MIXERS • FLEXIBLE COUPLINGS



Gardner disc features add safety... improve accuracy

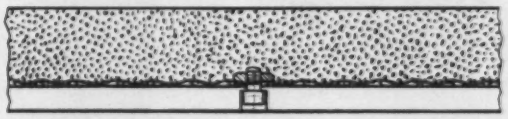
Gardner TRU-LOK® disc mounting
truer running—closer precision



Proper centering of disc on steel wheel assured by Tru-Lok.

Greater accuracy—Tru-Lok eliminates run-out and vibration caused by off center mounting.

Gardner WIRE-LOKT® construction
maximum safety—maximum economy



Full value—the entire rated thickness of the abrasive is usable.

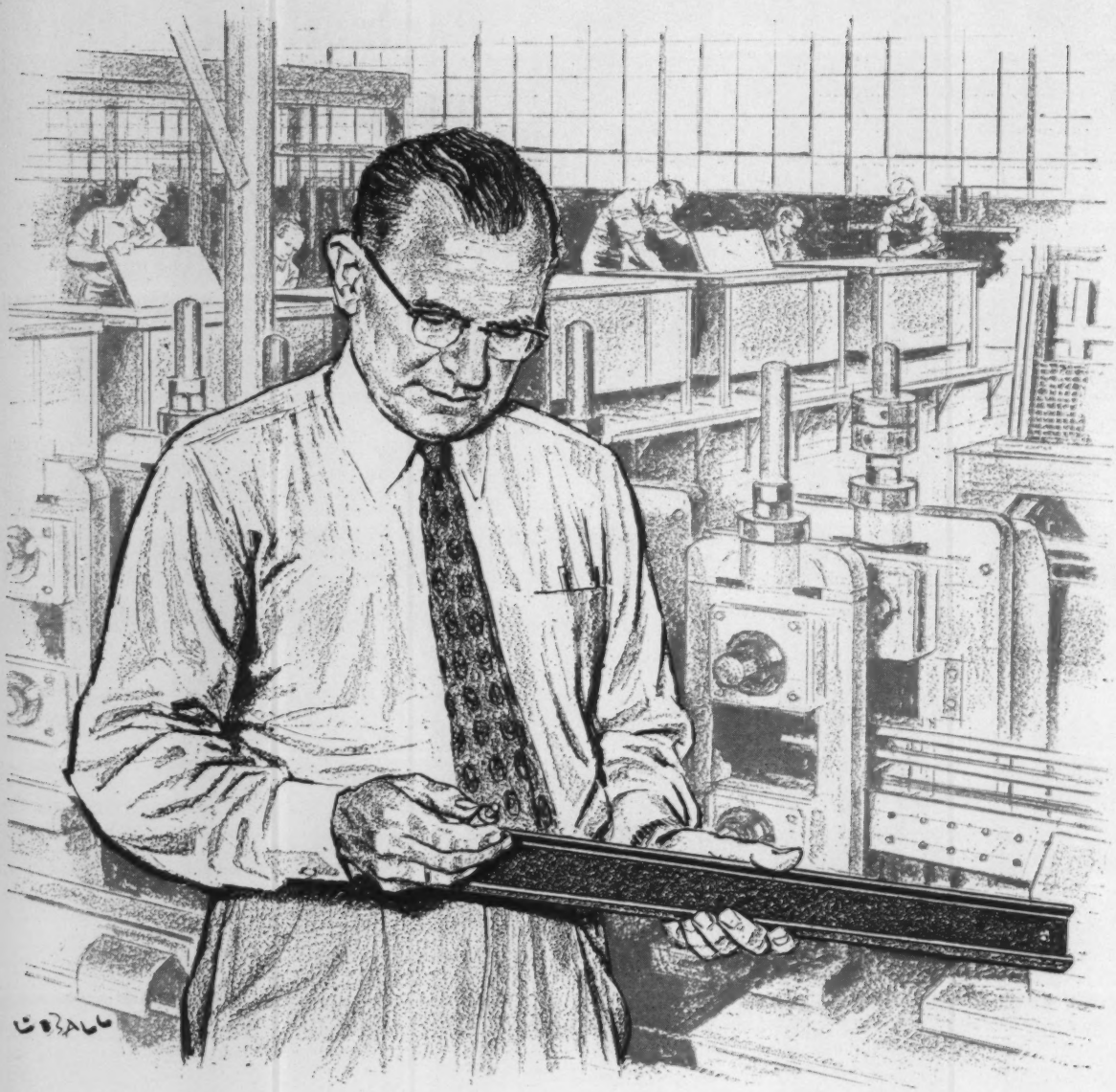
Safety—heavy, imbedded steel mesh assures maximum safety.

Call the man who can give you the *most* in practical, cost saving help with your flat surface grinding . . . your Gardner Abrasives Specialist.

GARDNER

abrasive discs

BELOIT, WISCONSIN



"We know why the word quality is associated with Sharon Steel"

—FRANK CHUFO, Chief Inspector
The General Fireproofing Company

"Over the past quarter-century we have used hundreds of tons of Sharon Steel in vital parts of our office furniture line," states Frank Chufo, chief inspector at General Fireproofing. "We have found Sharon Steel consistently to be to specification with excellent workability, uniformity and tolerance control. I'm convinced it's hard to beat the quality of steel we get from the *Sharon Steel Corporation, Sharon, Pa.*"

SHARONSTEEL **SHARON** *Quality* **STEEL**

Steel

The Cuban Situation: Caution—Commies at Work!

We have a tough nut to crack in our relations with Cuba. How we play our cards and how clean we keep our noses will have a lot to do with how things down there will affect us.

The world won't stand still for a big stick. These are not the "good old days." But at the same time, our government can't stand still and let the Communist apparatus in Cuba supply Fidel Castro with lying, but powerful insults.

It doesn't make it any easier, either, to see oil companies being threatened with expropriation if they don't refine Soviet oil. It isn't easy for American steel companies and others to see their millions of dollars sterilized in a tied-up nickel situation.

The confusion, revolution, cross-currents, and anti-American feelings in Cuba were made to order for the Reds. The same pattern used in Europe and Asia is now unfolding in Cuba. Whether or not the Latins will fall for this stuff remains to be seen.

Now Castro is being supported, surrounded, egged on—and probably directed—by the commie clique. They have much "bigger" plans for themselves—and for foreign companies.

Certainly the Soviets are going to make use of this golden opportunity to try to establish a satellite near our shores. They may make considerable headway from the nuisance standpoint. And if we botch up the whole thing, they will go much further than being a nuisance.

But it is doubtful if either the USA or American firms doing—or trying to do—business in Cuba will muff the ball. Our government has not answered in kind. It has bounced back with facts. If Castro's crowd are liars, we should prove it by calm statements of fact.

The job of the oil and steel companies is much more difficult. True, they always take a risk outside their own nation. Events show they certainly took one in Cuba. But in taking a strong stand against being "used" by the Reds in Cuba, American companies should have complete cooperation from our government.

Firms that have little or no patience or experience in Cuba had better talk seriously with those who do and have. They know their way around and can help prevent missteps.

This is the time to walk quietly but talk up with facts. It also is the time to keep from doing exactly what the Reds want us to do—inflame all Latin Americans.

Tom Campbell

Editor-in-Chief

CASE HISTORIES

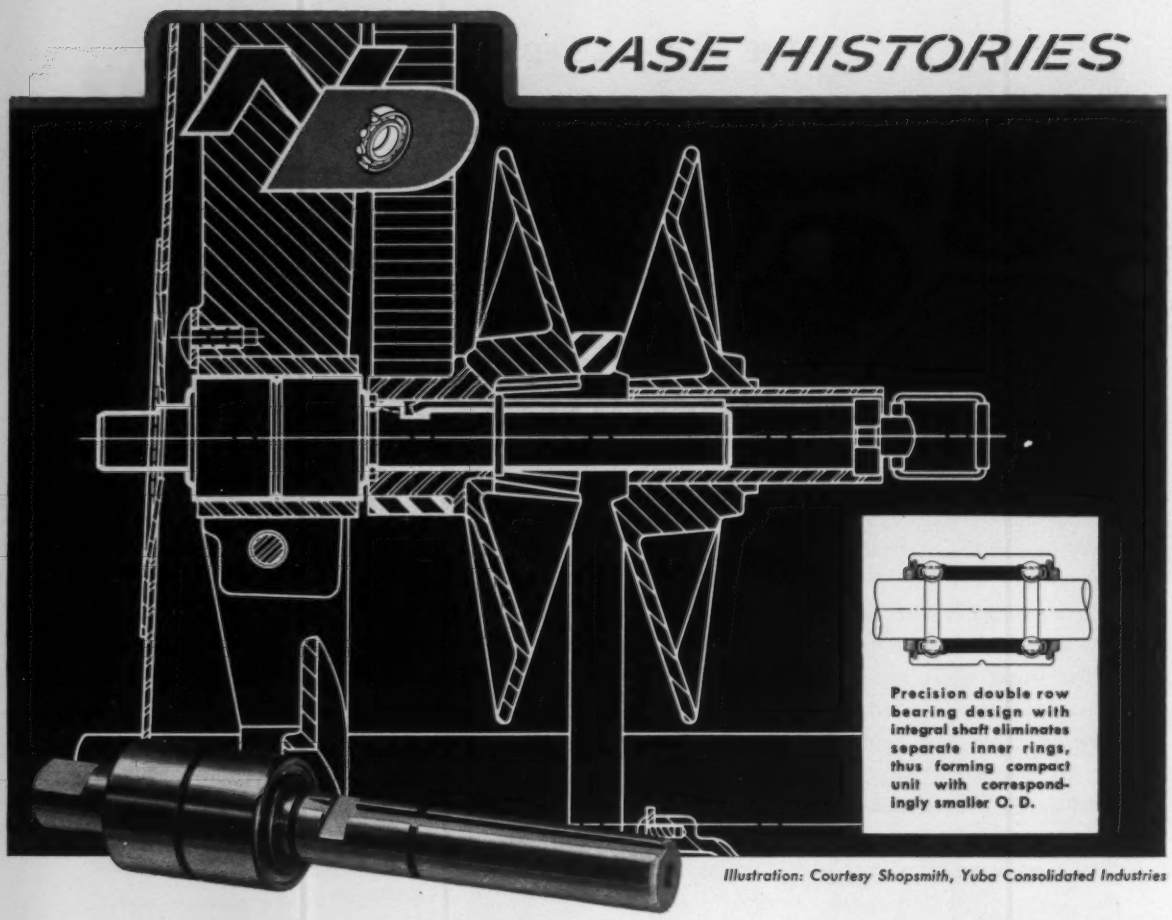

Precision double row bearing design with integral shaft eliminates separate inner rings, thus forming compact unit with correspondingly smaller O. D.

Illustration: Courtesy Shopsmith, Yuba Consolidated Industries

N/D Bearing Solves Home Power Tool Speed Changing Problem!

CUSTOMER PROBLEM:

Require low cost, compact idler shaft assembly for speed changer in popular, multi-purpose home power tool. The assembly must mount on ball bearings . . . operate at speeds up to 6000 RPM.

SOLUTION:

N/D Sales Engineer, cooperating with customer engineers, recommended a *single* N/D ball bearing —a compact integral shaft unit designed as part of idler assembly. The unit permits one of two interlocking variable pitch pulley halves to slide axially on shaft when changing pitch at high speed. This precision, automotive type fan and water pump bearing eliminates extra parts inventory and shaft machining . . . reduces assembly time. In addition to solving complex design problem, N/D's compact heavy-duty ball bearing is integrally sealed for protection against saw-generated dust . . . and lubricated-for-life for added end user sales appeal!

If *you're* designing new equipment, why not call your New Departure Sales Engineer. He probably can help engineer your application with a standard, volume-produced N/D ball bearing that will help solve your bearing problem. For more information contact New Departure Division, General Motors Corporation, Bristol, Connecticut.

Replacement ball bearings available through United Motors System and its Authorized Bearing Distributors.

NEW DEPARTURE

BALL BEARINGS

proved reliability you can build around

Wires Withstand 1500°F

Nickel- and cobalt-chromium wires will serve in re-entry parachutes for manned satellites. Without coatings, these wires provide oxidation resistance which meets anticipated conditions. Other materials offer future possibilities — but they require more research. Among other materials being studied are: high-melting glasses such as vitreous silica and aluminum-silicate fibers; alloys from refractory metals; and single crystals.

Convenient Dry Lubricant

Dry molybdenum-disulfide lubricant is available in stick form. This permits easy application of a lubricating film to cutting and shaping tools, sliding areas of machine parts, or wherever dry-metallic friction occurs on sliding surfaces. Application is simple. Machine operators just rub the sticks over cleaned surfaces.

Unit Grinds Fine Finishes

A precision centerless-type machine puts a fine microfinish on troublesome small rounds. It handles a wide range of sizes. Use of various grits and bonds allows the new machine to finish both hard and soft metals. Key to the unit's plunge-cut technique, invented in Germany, is a pneumatic system that actuates the tool. This allows high-frequency oscillation and uniform stone wear.

Self-Contained Power Unit

Need a self-contained power unit? A prototype 100-w generator is on the way. Isotopes provide the heat. This makes possible power units ranging from 5 to 500 w in power-weight ratios as low as 1 lb per watt.

Provides New Metallic Fuel

Columbium-uranium alloys show promise as metallic fuels for small-scale nuclear reactors. A columbium alloy containing 20-pct uranium has good tensile strength at temperatures in the 1600° F range. By contrast, present-day metallic fuels swell and are otherwise unserviceable above 1200°F. Columbium alloys also have high thermal conductivity and they demonstrate good corrosion resistance.

Reverse-Draw Forms Parts

Reverse-draw methods help to produce universal-joint shields for farm implements and trucks. These methods allow steel sheet to flow into shape without using pressure pads. This reduces the amount of material thinning. The reverse-draw method forms shields with 4- to 6-in. bells, 1¾- to 3½-in. deep. Some of these shields include an extruded and ironed flange to a height of 15/16 in.

Speed Furnace Repairs

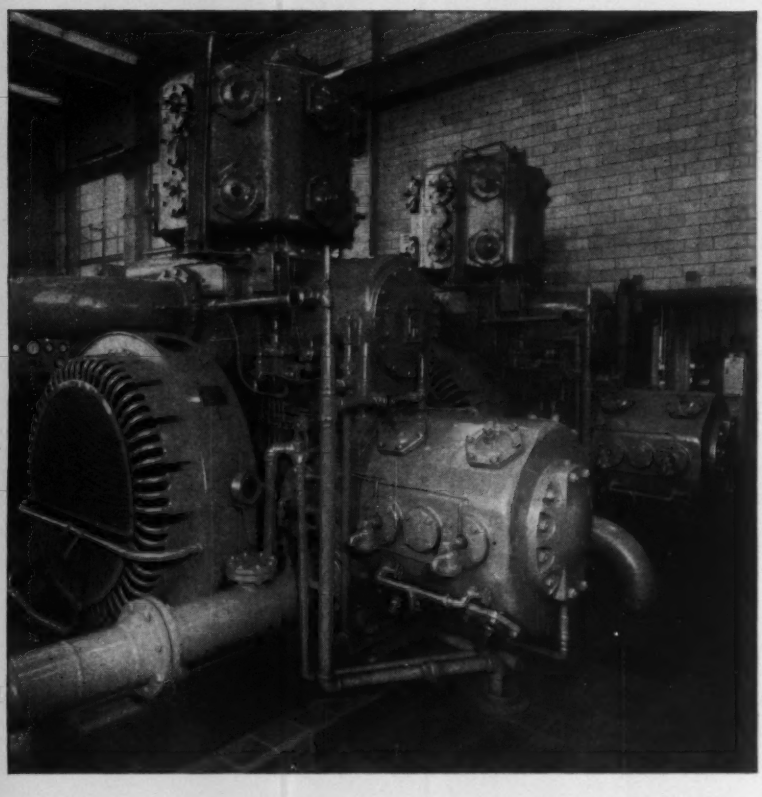
A new slurry-mix, mixer and gun provide hot patching of basic openhearth furnaces. This team permits gradual and even coatings of fine-ground refractory materials to furnace roofs, back walls, port skews, front walls and uptakes. The new process can also be used for maintenance of nonferrous furnaces.

Nylon Gasoline Lines

Tomorrow's automobiles may have gas lines made from Nylon-6 tubing. This tough, flexible tubing has been tested on a fleet of automobiles. It also shows promise of being adaptable to other gasoline-powered vehicles. The lines, which extend from the gas tank to the fuel pump, are easy to install. They are made from ¼-in. tubing with a wall thickness of only 1/32 in. These lines can be used with standard fittings.

Ceramics Serve as Rollers

Ceramic rollers, made at Russia's Khar'kov Institute of Mining, are free from many of the defects inherent in metal rollers. And they are reported to be less expensive. These ceramic rollers rotate freely on non-treated shafts. Internal surface of the bushing and the shaft's surface "run in" rapidly and attain a mirror-like smoothness.



IN I-R COMPRESSORS,

TIME TELLS

THE DIFFERENCE

In these two XLE compressors, 21 Channel Valves have operated

45,482 HOURS

with no parts replaced!

The two Ingersoll-Rand XLE air compressors shown above are installed at a large midwestern automotive plant. They were started up in May, 1951, and at this writing have totalled 45,482 hours, mostly at 16 to 24 hours a day.

Of the 28 Channel Valves (14 per unit), 21 have operated full time with *no repairs*, merely being cleaned once a year. Each of the other seven valves had only one channel and spring replaced in all this time, during the scheduled inspection period. And all the valves are operating with their seat plates still on the first side—when the plates are turned over, their life will be doubled.*

The *extra value* that's built into every type of Ingersoll-Rand compressor pays off with *long-run economy*. Reduced maintenance and attention, over many years, mean long-range savings in the cost of air power. Ask your I-R representative for more information on the world's most complete line of compressors, from 1/2 to 7500 hp. Call him now.

***Only I-R compressors have Channel Valves**

Known for high efficiency, quiet operation and exceptional durability. Entirely different. Each valve is a combination of rigid stainless-steel channels and bowed leaf springs, with trapped-air spaces which cushion action, prevent impact.

Ingersoll-Rand

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111A1

The World's Most Comprehensive Compressor Experience

Market Potential

Sir—I recently received some literature from your company listing several market potential studies. I am particularly interested in the report on Grinding Wheels and Coated Abrasives, and would greatly appreciate receiving a copy for inspection.

Your company is to be complimented for the great strides which you are making in filling a conspicuous void in market information. Your efforts are certainly very much appreciated by those in Marketing Research positions.—M. P. Harris, Supervisor, Marketing Research Dept., Minnesota Mining and Manufacturing of Canada, Ltd., London, Canada.

■ **The material has been sent.—Ed.**

Predictions

Sir—I would appreciate it very much if you could provide me with three copies of your article entitled "Computers: Key To Predicting Blast Furnace Behavior," which appeared on page 61 of the June 2 issue. I feel this article was very interesting and feel it would be of great value in my files.—J. Denges, Industrial Sales, Minneapolis-Honeywell Regulator Co., Cincinnati, O.

■ **Copies are on the way.—Ed.**

New Idea

Sir—I have obtained a copy of the Feb. 18 issue of The IRON AGE, and noticed on page 2 the title "Business Conformity, More Daring Wanted," (see "Are Organization Men Wanted?" IRON AGE, Feb. 18, 1960).

I wonder how true this is. Our scientists say men who figure out new things are not rewarded or understood.

I have a patented idea on an entirely new line of pitch paned plate for clading homes and buildings in metal. I do not seem able to break through the orthodox crust of the conventional and reach anybody with this idea.—George F. Waske, Parnell, Mo.

■ **Perhaps a reader would be interested.—Ed.**

The Inventor

Sir—The article "Nail Automation Challenges Foreign Competition," in your March 31 issue was drawn to my attention by Mr. Charles Jacobson, of Dake Corp. His is the company whose operations were described in the article. I understood him to say that the copy he approved for this article stated that I was the inventor and developer of the patents on the electro-magnetic parallel packaging machine. However, that statement did not appear in your article.—Stuart Otto, Westport, Conn.

■ **Our apologies to Mr. Otto for failing to include the statement that he had developed and patented the machine.—Ed.**

"Experience? Yes, I had a very funny one on the way over here."

TO MEET YOUR REQUIREMENTS

STANDARDIZE 100% ON Southern FASTENERS

Just name your fastener requirements. Chances are that the screw or bolt you need now is in Southern Screw's stock of 1,500,000,000 pieces—and in the exact size, head style, material and finish you want. If special plating is one of your requirements, Southern has its own plating department.

Perhaps price is a big factor. Remember; in the final analysis, the best cost less. Southern fasteners are the best you can buy.

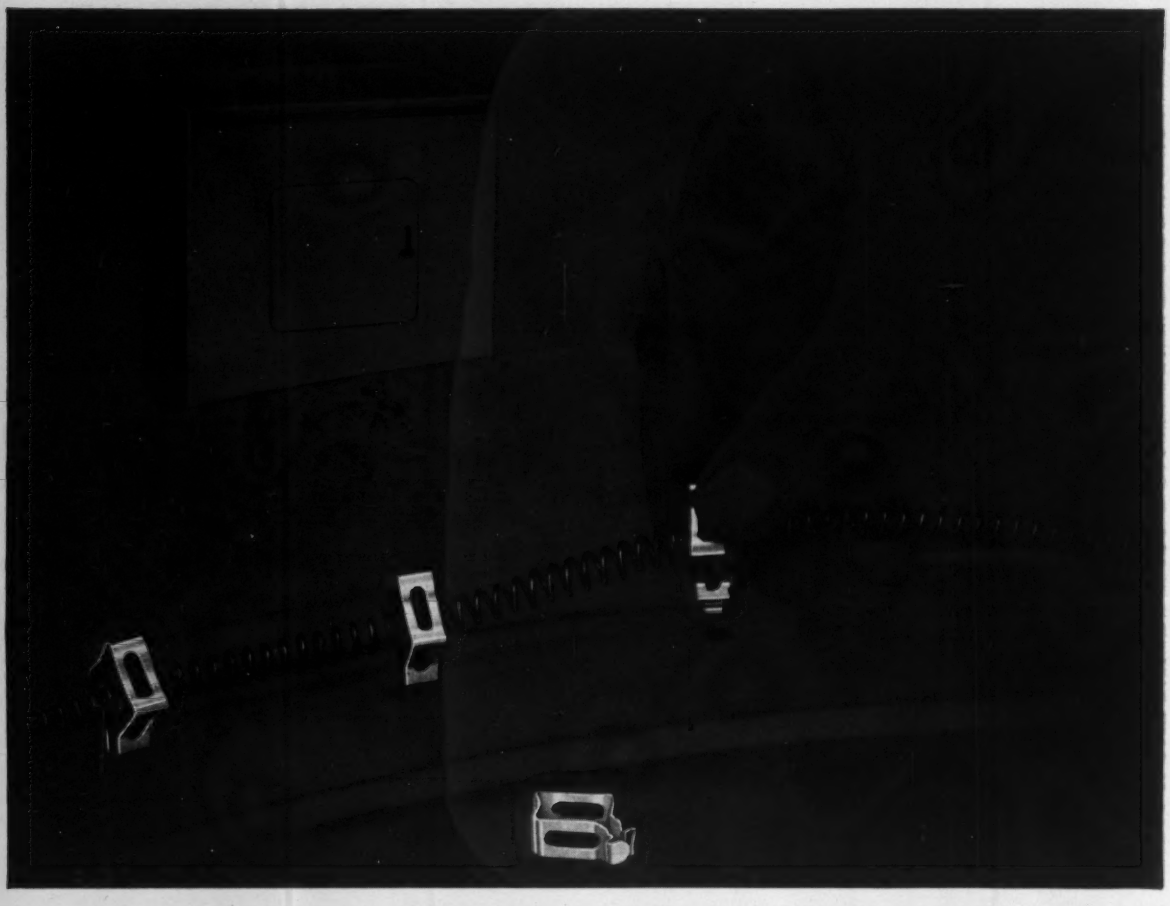
Why not see for yourself how USA-made Southern fasteners can meet your requirements. Get in touch with your nearest Southern Screw distributor, or write Southern Screw Company, P.O. Box 1360, Statesville, North Carolina.

Manufacturing and Main Stock in Statesville, North Carolina

WAREHOUSES:
New York • Chicago • Dallas • Los Angeles

Machine Screws & Nuts • Tapping Screws • Stove Bolts • Drive Screws • Carriage Bolts • Continuous Threaded Studs • Wood Screws

Southern SCREW COMPANY
STATESVILLE • NORTH CAROLINA



Engineered by Tinnerman . . .

SPEED CLIPS® reduce costs, simplify assembly and servicing on Maytag "Halo of Heat" Dryer

Clothes are dried efficiently in the famous Maytag "Halo of Heat" automatic dryer. And now the quality of the "Halo of Heat" dryer is even better than ever because its unique circular heating element is fastened quickly, securely by 22 special Tinnerman SPEED CLIPS developed by joint efforts of Tinnerman and Maytag designers.

Each one-piece SPEED CLIP eliminates a separate welding operation on the "Halo of Heat" assembly. Various screw-driving operations formerly required on Maytag's assembly line to capture the ceramic insulator and secure the mounting clamp were also eliminated, with equally interesting reductions in cost. Now, the stainless steel, vibration-proof fastener is snapped in place with simple "button-hook" action. No special skills or equipment are required. Assembly and parts costs have been reduced . . . *substantially!* Serviceability in the field has been improved.

A free Tinnerman Fastening Analysis of your own product can show you where similar assembly and cost-saving advantages are possible. Call your Tinnerman representative—he's listed in the Yellow Pages under "Fasteners". Or write to:

TINNERMAN PRODUCTS, INC.
Dept. 12 • P. O. Box 6688 • Cleveland 1, Ohio

TINNERMAN
Speed Nuts®

FASTEST THING IN FASTENINGS®

CANADA: Dominion Fasteners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales. FRANCE: Simmonds S. A., 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano-Bundy GmbH, Heidelberg.

FATIGUE CRACKS

Capital Appropriations

Back in the fall of 1957, we went to work with the National Industrial Conference Board, (the oldest, nonprofit business research organization in the country) to provide what we think is the best continuing business indicator possible for IRON AGE readers.

It's our quarterly survey of Metalworking Capital Appropriations. And you'll find the second of this year's series starting on p. 73 of this issue.

Personal Attention—This series, has been the particular "baby" of managing editor E. C. Beaudet. He personally handles each set of figures that goes into the charts, writes the interpretation of what they mean.

This week we dropped by his office to ask him something about the appropriations figures, why they are important, what they can mean to a metalworking executive. First, we asked why we selected metalworking "appropriations" as the key indicator.

He related the incident when a newspaper reporter asked the old bank robber Willie Sutton why he robbed banks. "Because that's where the money is," he replied with a felonious leer.

Proven Value—The best way to find out where the "money" is for future plant and equipment spending, so vital to metalworking, is to dig into capital appropriations.

This is just what we, with the NICB research facilities, have been doing with this continuing survey. You'll note that this issue's report not only shows what spending plans are, but also, with graphs and interpretation, that it really works.

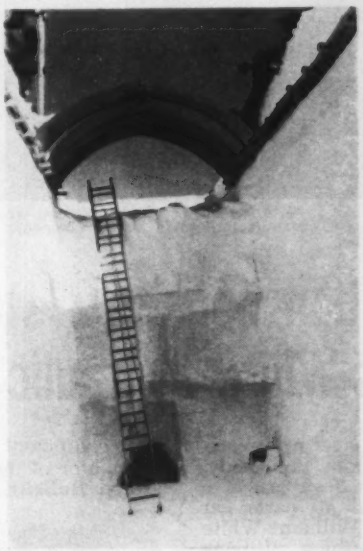
You'll see proof that if you have been following the series, you had advance information of capital spending trends. It's something that can't be measured in value to any metalworking executive.

The Hot of the Matter

Outside our office today (and yours, too, we're certain) the temperature and humidity got together and offered up a nice hot, muggy day.

Coming back from lunch we panted to our desk and waited for the air conditioning to help snuff out the memory of the street scene. Our minds drifted to a nice cooler and we got one. A psychological one, anyway.

The picture below is one of a number we received telling of the cold life ahead for those living in a new Greenland underground city. It served its purpose and soon we had forgotten completely about the heat and were thinking about the cold, miserable days last winter when we stood out in the open waiting for the bus we had just missed.



TALL COOLER: Snow will harden over these steel forms. When the steel is removed an ice roof will cover a corridor for the ice capped city.

We decided we'd rather sit here and fight the heat than be helping to put up Republic Steel Corp.'s side rails for roof forms in an ice capped city.

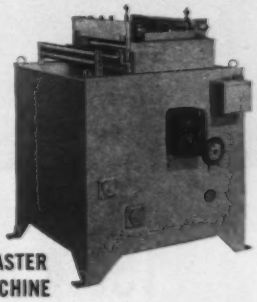
Maybe October will be nice. It was last year.

What's NEW in Press Room Equipment?

See these **benchmasters** for **improved feeding, better low-cost production!**

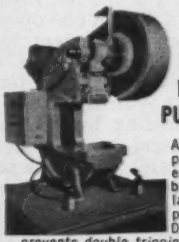
BENCHMASTER "MAF" MACHINE

Motorized Automatic Feeding (MAF) Machines supply uniform measured lengths of flat strip or coil stock to any secondary machine. They cycle either manually or by linking to a machine for automatic feed. Stock is pulled from a reel, or preferably, from a KOIL-KRADLE slack loop. Feed length is adjustable from 3" to 60". Stock widths up to 12" wide. Other capacities on special order.



BENCHMASTER "FS" MACHINE

The Combination Length-Feeding and Straightening (FS) Machine automatically straightens flat strip or coiled stock and supplies measured lengths to a secondary machine. It also pulls from a reel or KOIL-KRADLE slack loop. By first removing curl, kinks, etc., stock feeds faster with greater accuracy, improves production and quality of parts.



IMPROVED BENCHMASTER ELECTRO-MAGNETIC PUNCH PRESS CLUTCH

A safe, manual or automatic punch press clutch that eliminates sliding keys, breakage hazards and time lag . . . pickup occurs at any part of flywheel rotation. Dual purpose cam switch prevents double tripping. Single trips or operates continuously. Other electrical control settings for manual set-ups, foot control, 2 button hand control or automatic operation.

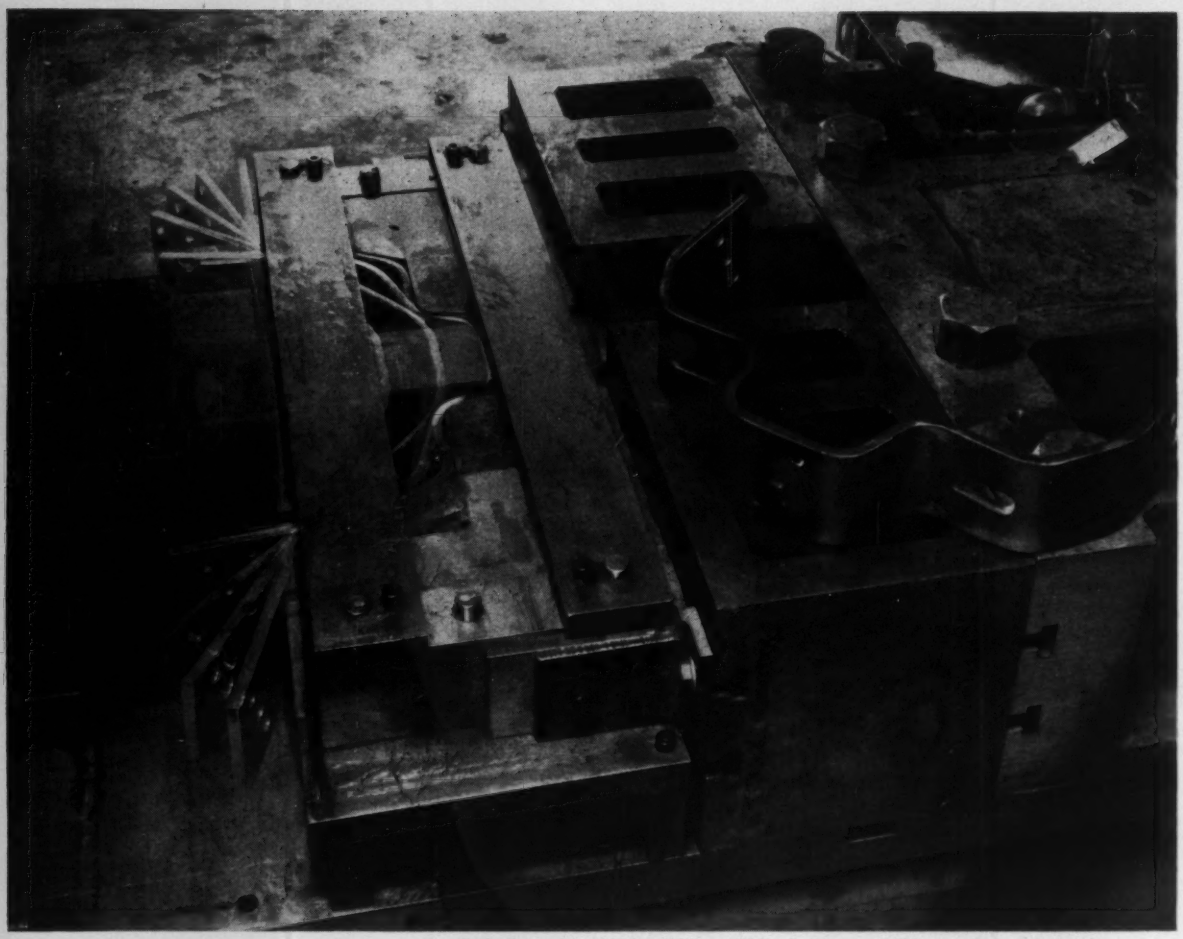
Also available: Air Clutch and Mechanical Clutch Equipped Presses.

FREE LITERATURE—WRITE TODAY!

benchmaster

World's largest manufacturer of small punch presses and mills.

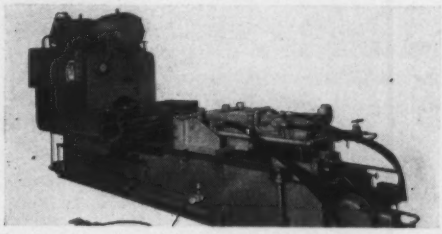
1835 W. Rosecrans Avenue • Gardena, California



Parts formed by 100-ton Williams-White Bulldozer at Chicago plant of Joslyn Manufacturing and Supply Company. Holes are drilled in previous operation.

150% production boost -- 2 steps eliminated with Williams-White hydraulic Bulldozer

The job: Form a hot rolled steel workpiece, ½" x 4" x 42", in one operation. Previously, this tough assignment took 3 strokes of a press. Production rate was 40 parts per hour. NOW — a 100-ton Williams-White Bulldozer with hydraulic cushion, utilizing special tooling by Joslyn engineers, forms the hot steel in one squeeze. Current production rate: 100 parts per hour. The production increase and elimination of 2 steps in this application are typical of results gained with Williams-White heavy machinery and skillful tooling. Check into the time and money-saving advantages of metal forming equipment built by Williams-White, originator of the bulldozer. Write for illustrated Bulletin #73.



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the measure of Performance Reliability for more than a century

BULLDOZERS • PRESSES • SHEARS • BENDERS • PUNCHES • HAMMERS

COMING EXHIBITS

Production Engineering Show — Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16. International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show — Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

Metal Show—Oct. 17-21, Convention Hall, Philadelphia. (American Society for Metals, Metals Park, Novelty, O.)

Die Casting Exposition & Congress —Nov. 8-11, Detroit Artillery Armory, Detroit. (The Society of Die Casting Engineers, 19382 James Couzens Highway, Detroit 35.)

MEETINGS

JUNE

Drop Forging Assn.—Annual meeting of members, June 26 - 29, Seigniory Club, Canada. Association headquarters, 1121 Illuminating Bldg., Cleveland.

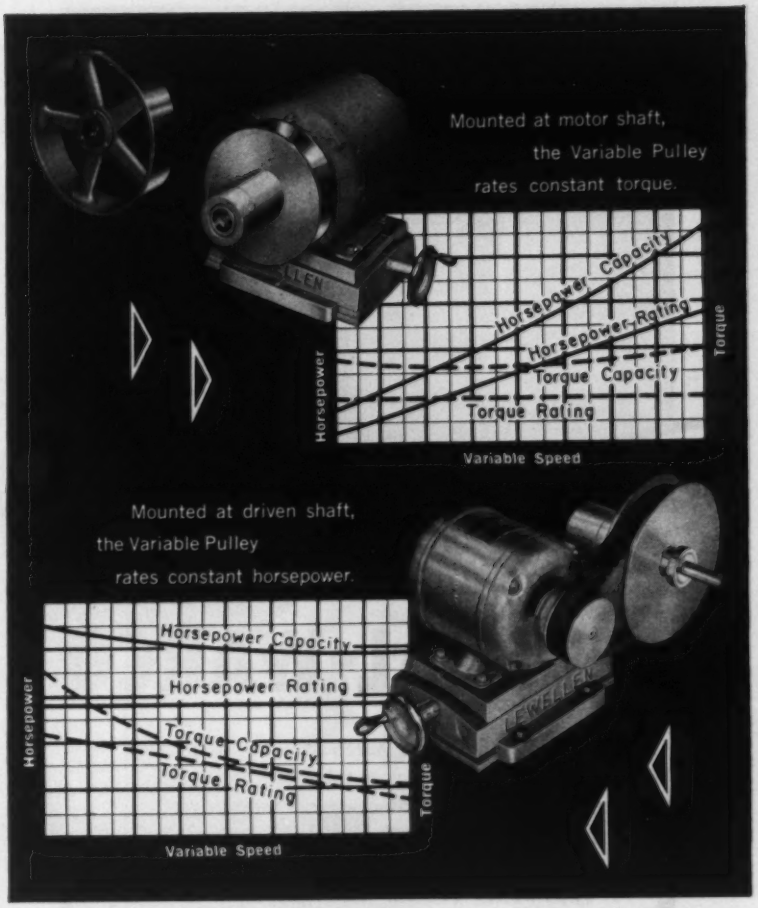
American Society for Testing Materials—Annual meeting and apparatus exhibit, June 26-July 1, Chalfonte-Haddon Hall, Atlantic City, N. J. Society headquarters, 1916 Race St., Philadelphia 3, Pa.

JULY

Truck Trailer Mfrs. Assn.—Annual summer meeeting, July 10-13, The Homestead, Hot Springs, Va. Association headquarters, 710 Albee Bldg., Washington, D. C.

Cast Iron Pipe Research Assn.—Annual meeting, July 13-14, The Seaview Country Club, Absecon, N. J. Association headquarters, Prudential Plaza, Suite 3440, Chicago.

(Continued on P. 16)



LEWELLEN

VARIABLE PULLEY HORSEPOWER TORQUE CHARACTERISTICS

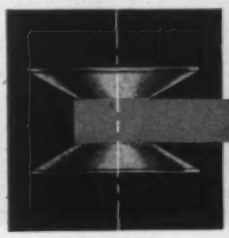
The LEWELLEN Variable Pulley may locate at motor shaft or driven shaft.

The location chosen obtains constant torque or constant horsepower characteristics, and adapts the Variable Pulley to the work load pattern.

Speed ranges of 3:1 and 4:1 are available. Fastest speeds may exceed motor speed.

Ratings are fractional to 25 H. P. Class II—1.4 service factor applies to all ratings.

There are several other characteristics of the LEWELLEN Variable Pulley that make it particularly useful and adaptable for accomplishing variable speeds.



We would like for you to have our Catalog 70 if you are interested.

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Manufacturing Company, Columbus, Indiana

Distributors in all Industrial Areas

Eastman Kodak uses...
FEDERAL-WARCO
At Eastman Kodak, Warco straight-side presses turn out millions of close-tolerance, high-quality parts for Kodak cameras and motion picture projectors.
Precision, quality and high volume are Kodak watchwords. Federal-Warco plays a vital role in helping Kodak meet its rigid production requirements consistently.
THE FEDERAL MACHINE AND WELDER COMPANY
Warren, Ohio
Federal WELDERS
Warco PRESSES

MEETINGS

(Continued from P. 15)

Metal Lath Mfrs. Assn.—Summer meeting, July 20-21, Carlton House, Pittsburgh. Association headquarters, Engineers Bldg., Cleveland.

American Electroplaters' Society—Annual convention, July 24-28, Statler Hotel, Los Angeles. Society headquarters, 445 Broad St., Newark, N. J.

SEPTEMBER

American Machine Tool Distributors Assn.—Annual meeting, Sept. 3-4, LaSalle Hotel, Chicago. Association headquarters, 1500 Massachusetts Ave., N. W., Washington 5, D. C.

Assn. of Lift Truck & Portable Elevator Mfrs.—Fall meeting, Sept. 12, The Cavalier Club, Virginia Beach, Va. Association headquarters, One Gateway Center, Pittsburgh 22, Pa.

Electronic Industries Assn. — Fall conference, Sept. 13-16, French Lick-Sheraton, French Lick, Ind. Association headquarters, 1721 DeSales St., N. W., Washington, D. C.

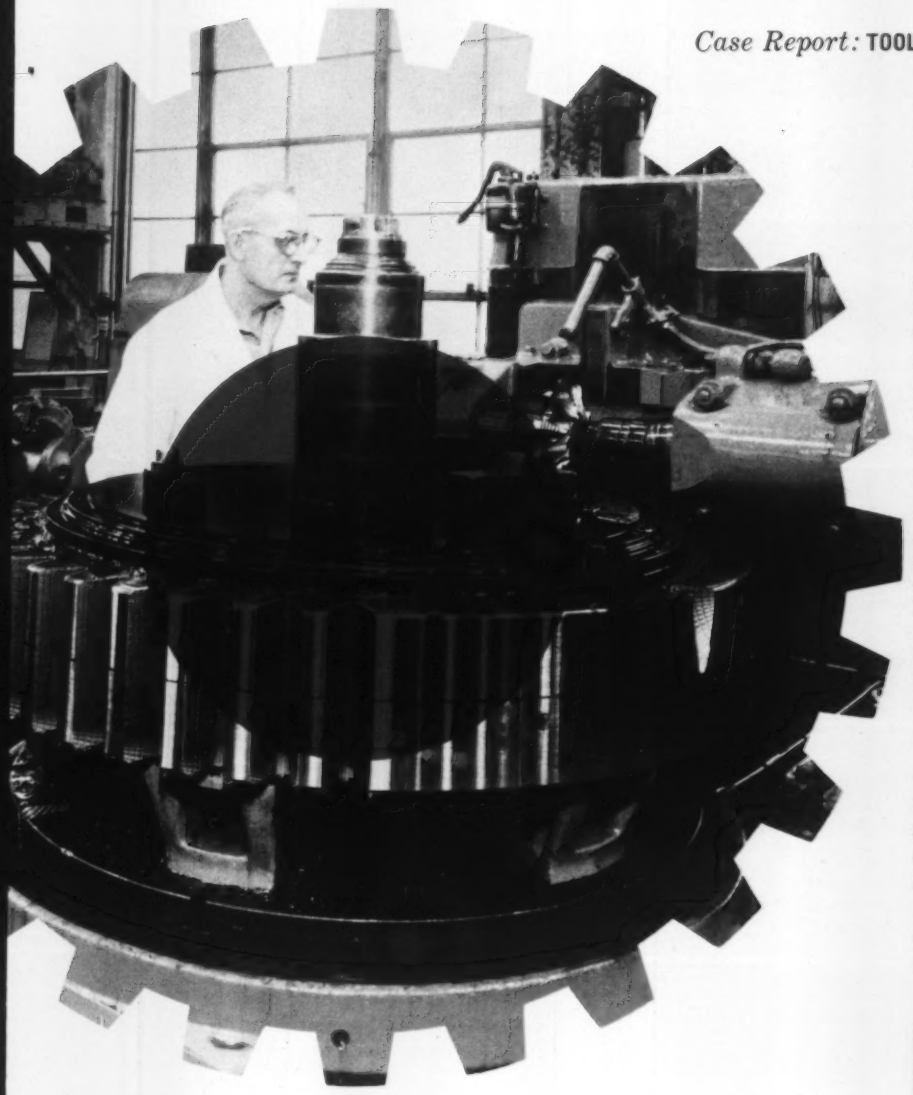
American Die Casting Institute—Annual meeting, Sept. 14-16, Edgewater Beach Hotel, Chicago. Institute headquarters, 366 Madison Ave., New York.

National Foundry Assn. — Annual meeting, Sept. 22-23, Edgewater Beach Hotel, Chicago. Association headquarters, 53 W. Jackson Blvd., Chicago.

Porcelain Enamel Institute, Inc.—Annual meeting, Sept. 25-28, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 1145 19th St., N. W., Washington, D. C.

Farm Equipment Institute—Annual convention, Sept. 25-28, The Statler Hilton Hotel, Dallas, Tex. Institute headquarters, 608 S. Dearborn St., Chicago.

USERS PROVE ALCO HI-QUA-LED STEEL FORGINGS CUT MACHINING COSTS UP TO 50%



Case Report: **TOOL STEEL GEAR & PINION CO.**

Hi-Qua-Led Forgings
Cut Machine Time 45%

The Tool Steel Gear & Pinion Co., Cincinnati, achieves large savings in gear-machining operations with ALCO's Hi-Qua-Led Steel forged and rolled rings. On one gear ring, for example, Tool Steel reduced turning time 22% before hardening, and 42 % after hardening. Gear hobbing time was cut 43%, rebore 45% and key seating 50%. Average time reduction was 45%.

Hi-Qua-Led forgings machine this easily because of a lead additive which increases shear angle and reduces tool friction. Result: heavier cuts and higher cutting speeds. Expensive tooling lasts longer—five, 10, even 100 times longer.

These big savings are only part of the story. Because Hi-Qua-Led forgings have the same mechanical properties as regular forgings of the same grade, Tool Steel can stand squarely behind its unique guarantee: "Any deficiency made good by cash or new materials."

ALCO

Case Report: WARNER & SWASEY CO.

Increased Capacity with
No Additional Investment

Warner & Swasey Co., Cleveland, uses Hi-Qua-Led open-die forged bars for the pentagon-shaped tool holders in their 2AC and 3AC automatic chucking machines. It adopted Hi-Qua-Led for this job three years ago, because it found that machining speeds on every operation—turning, milling, sawing, trepanning, grinding and drilling—could be increased by at least 50%.

The decrease in machining *time* Warner & Swasey gets is about 3 hours per forging. This compensates for the extra cost of Hi-Qua-Led. But Warner & Swasey reasons that Hi-Qua-Led actually expands its production capacity, without any added investment in factory or tools. This is worth about $60 per forging, according to Warner & Swasey figures.

ALCO

Case Report: LUFKIN FOUNDRY & MACHINE COMPANY

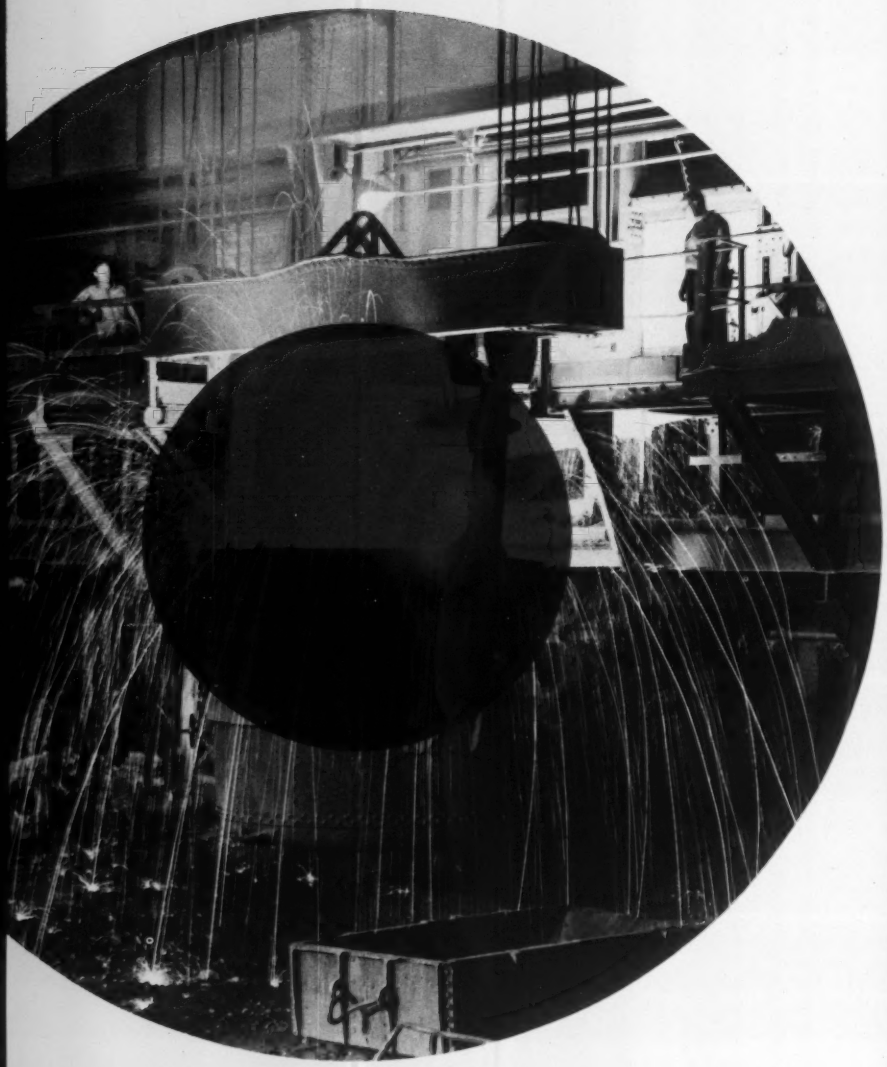
Higher Quality Gears for the Same Cost

Lufkin Foundry & Machine Co., Lufkin, Tex., uses Hi-Qua-Led forged and rolled rings for 60 in. diam. herringbone gears in its large oil-well pumping units. Previously, cast rings had been used.

Lufkin F&M finds that, although the Hi-Qua-Led rings' price is higher, their machinability cuts the cost of the finished fabricated gear to that of the cast gear. Lufkin is thus able to put a better, more uniform gear in its pumping units for the same cost and provide improved equipment and higher value to its customers.

The table below shows how Hi-Qua-Led rings reduced machining costs at Lufkin F&M.

HI-QUA-LED RING vs CAST RING			
OPERATION	CASTING	HI-QUA-LED	HI-QUA-LED SAVINGS
Turning	20 hours	8.1 hours	59.5%
Shape Teeth	80 hours	60 hours	25%
Tool Expense	$75.00	$25.00	67%



ALCO HI-QUA-LED STEEL FORGINGS RAISE PROFIT WITHOUT LOWERING QUALITY

While lowering machining costs, ALCO Hi-Qua-Led forgings have the same mechanical properties as regular forgings of the same grade. "In use" tests show that tensile strength, impact, fatigue and other properties are unchanged. Further, ALCO's exclusive patented lead-addition process guards against lead inclusions or segregates. You get the high quality you expect in custom-forged material.

Hi-Qua-Led Steel rings and forgings are furnished in any steel analysis. If you wish, ALCO will make up your order of regular forgings and include in it a Hi-Qua-Led forging, at no extra cost, for ALCO-supervised tests in your own plant. ALCO Products, Inc., Dept. 1501, Schenectady 5, N.Y.

SIZES AVAILABLE

OPEN DIE FORGINGS — RECTANGULAR
Maximum width — 32 in.
Maximum height — 32 in.
Maximum length — 40 ft
Maximum weight — 36,000 lb
Minimum weight — 1,000 lb

MANDRELLED RING FORGINGS
Maximum OD — 82 in.
Minimum OD — 24 in.
Maximum width — 60 in.

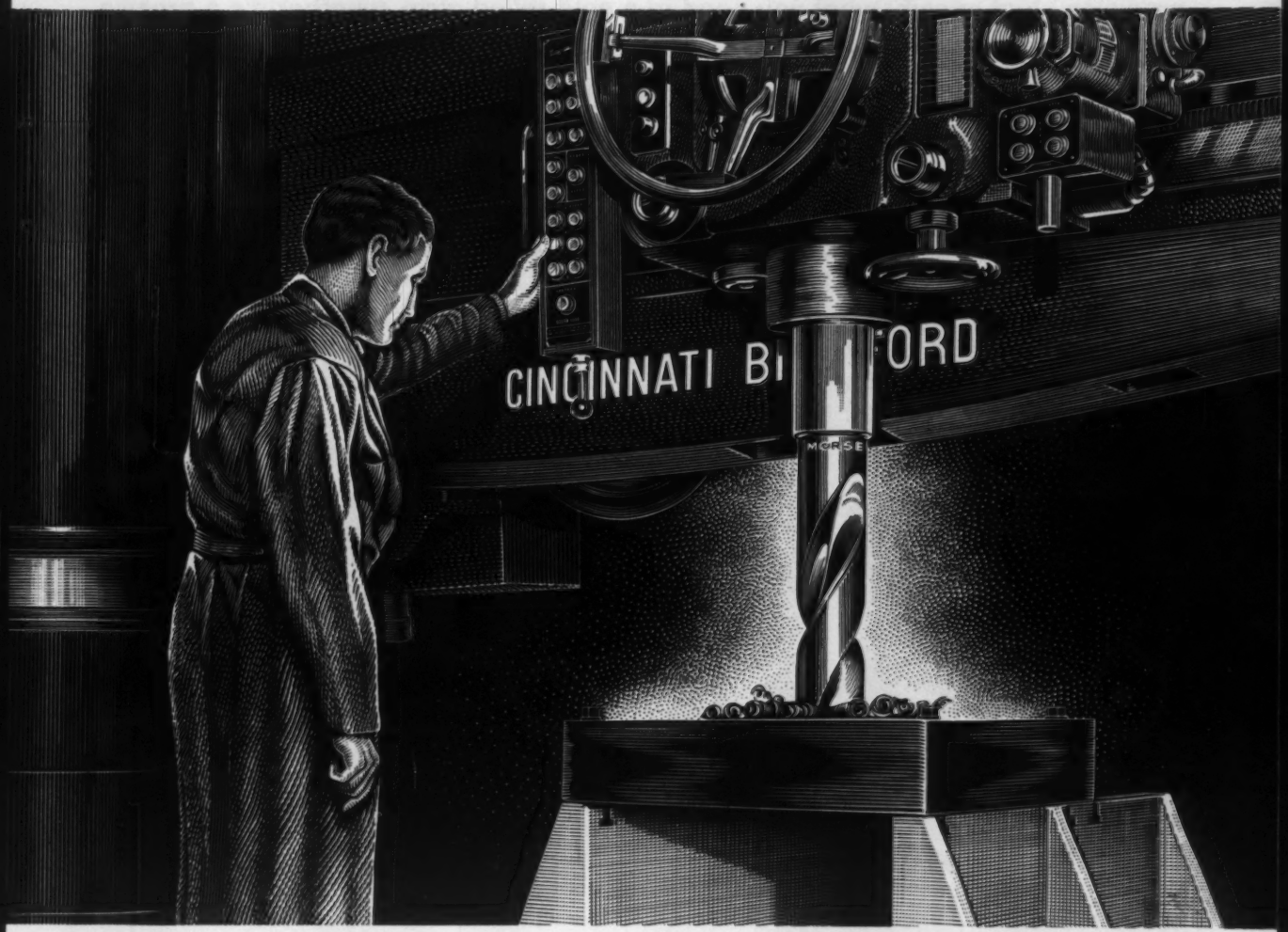
OPEN-DIE FORGINGS — ROUNDS
Maximum OD — 36 in.
Maximum length — 40 ft
Maximum weight — 36,000 lb
Minimum weight — 1,000 lb

ROLLED RING FORGINGS
Maximum OD — 160 in.
Minimum OD — 18 in.
Maximum width — 24 in.

ALCO FORGINGS

ALCO PRODUCTS, INC.

MORSE...CINCINNATI BICKFORD GIVE A SHOW OF STRENGTH



Morse tough tools easily take the thrust of world's most powerful radial drill... utilizes its full power.

Cincinnati Bickford caused many a drill manufacturer to throw up his hands when they looked for a drill tough enough to stand up under the thrust of the most powerful radial drill ever built. They found what they wanted at Morse... a regular taper shank drill right off the shelf.

Let Morse provide the easy solution for your tough jobs. Your Morse-Franchised Distributor will give you full details. Call him today.

MORSE

means "THE MOST" *in Cutting Tools*

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Morse means more production... smoother, more accurate production . . . with every type of cutting tool from drills, reamers, taps and dies, to end mills, milling cutters, slitting saws and "specials". So, if you want the best from every cutting tool you buy, mark your order "MORSE". For if you want *Morse Quality*, there's only one way to get it... *specify Morse.*

VN

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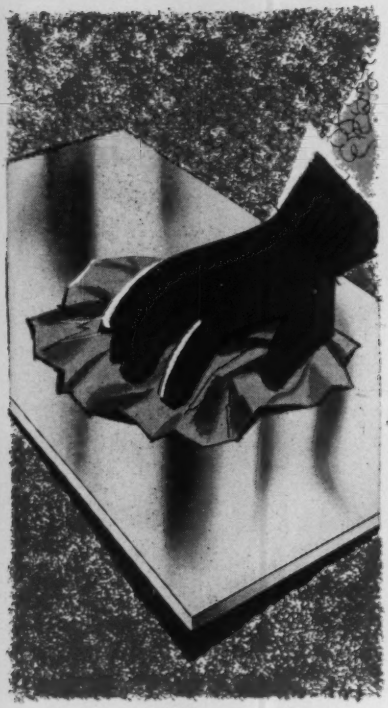
2375

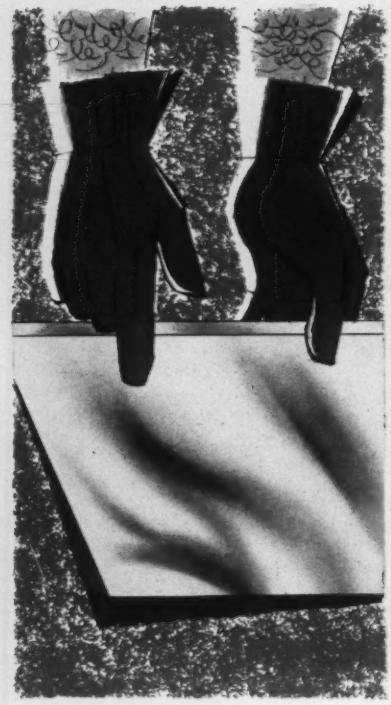
USS Amerstrip—everything about its method of manufacture has the stamp of precision. Just specify what you need in a cold rolled strip, whether it's a precise gauge, finish, edge, tolerance or temper and you get exactly what you specify. USS Amerstrip will keep your product quality high and consistent because of these six distinct advantages:

USS AMERSTRIP GIVES YOU PRECISELY



PRECISION FINISH

With USS Amerstrip we take special pains to give you a finish that is just right for the specific results you require in a finished product. We believe the Amerstrip finish is the finest you can get in the industry.



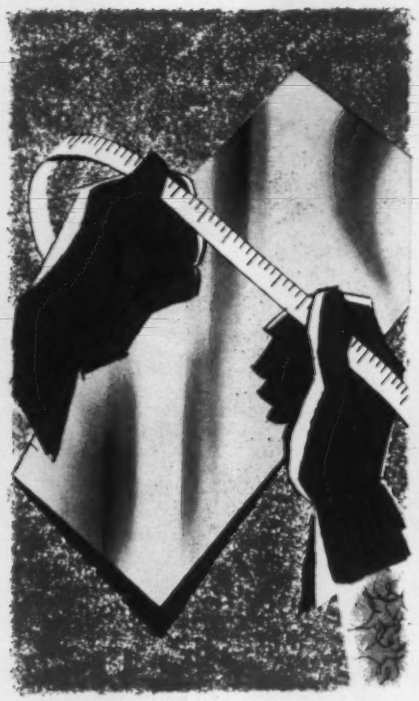
PRECISELY PREPARED EDGES

Because USS Amerstrip is produced in order-sized quantities engineered to your own specifications, we can give you precisely the edge finish you need. Choose your edge—square, standard, round, full round or bevel.

PRECISE TEMPERS

Whether your product must go through a deep draw or undergo other stringent forming operations, or if it requires a special temper for rigidity, you'll always get the correct temper for the job when you order USS Amerstrip.

WHAT YOU NEED IN A COLD ROLLED STRIP



PRECISE WIDTH TOLERANCES

When your fabricating machines require a special width strip, you can be sure that's the width you'll get with Amerstrip. We can produce USS Amerstrip within required tolerance limits to fit your special requirements.

PRECISE THICKNESS TOLERANCES

Whatever thickness tolerance your machines demand, you'll get it in Amerstrip. And it'll be precisely the same in every inch of Amerstrip ordered. Amerstrip can be rolled in thickness tolerances of plus or minus .0005 inches.

PRECISE UNIFORMITY

Regardless of the size of your order, every coil of USS Amerstrip comes off the line uniform in finish, temper, width and thickness. In short, USS Amerstrip's precision production assures a continuous run and high yield.

American Steel & Wire Representatives have the training and experience to give you expert guidance in fabrication and application of USS Amerstrip. They can show you how it contributes to a better finished product. To avail yourself of their services, call your nearest AS&W District Office. American Steel & Wire, 614 Superior Ave., N.W., Cleveland 13, Ohio.

USS and Amerstrip are registered trademarks

American Steel & Wire
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Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, New York

FOR THE MACHINERY PART

THAT TAKES THE BEATING

HAYNES Alloys *will do the job!*

Perfect performance for 100,000 hours at orange heat, in the combustion chambers of diesel engines, is quite an achievement. Yet it's the record of tens of thousands of special combustion cups of HASTELLOY alloy C in a well-known line of diesels.

The alloy was chosen for its unique high-temperature strength and corrosion resistance and its outstanding ability to hold heat.

These and other special properties are built into HAYNES alloys —to fit the particular needs of design and production engineers for machinery parts that must meet the roughest service conditions.

If you are designing such a part, investigate HAYNES alloys. There are more than 15 to choose from. They include HAYNES STELLITE cobalt-base alloys, HAYNES iron-base alloys, HAYSTELLITE cast tungsten carbide, and HASTELLOY nickel-base alloys. They are available as castings, forgings, completely fabricated parts, or as sheet and bar stock. All parts can be furnished machined or ground to specified size and finish.

HAYNES ALLOYS

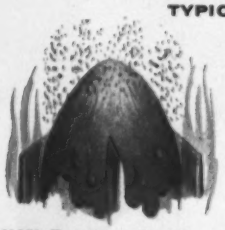
HAYNES STELLITE COMPANY
Division of Union Carbide Corporation
Kokomo, Indiana

UNION CARBIDE

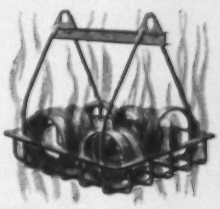
Address inquiries to Haynes Stellite Company, 30 East 42nd Street, New York 17, N. Y.

The terms "Haynes," "Haynes Stellite," "Hastelloy," "Haystellite," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

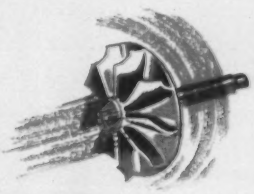
TYPICAL "HAYNES" ALLOY PARTS THAT RESIST...



ABRASION. Ten times the life and still no sign of wear, is the record of this plastics-extrusion torpedo nose made of HAYNES STELLITE alloy No. 3. This is one of many HAYNES wear-resistant alloys.

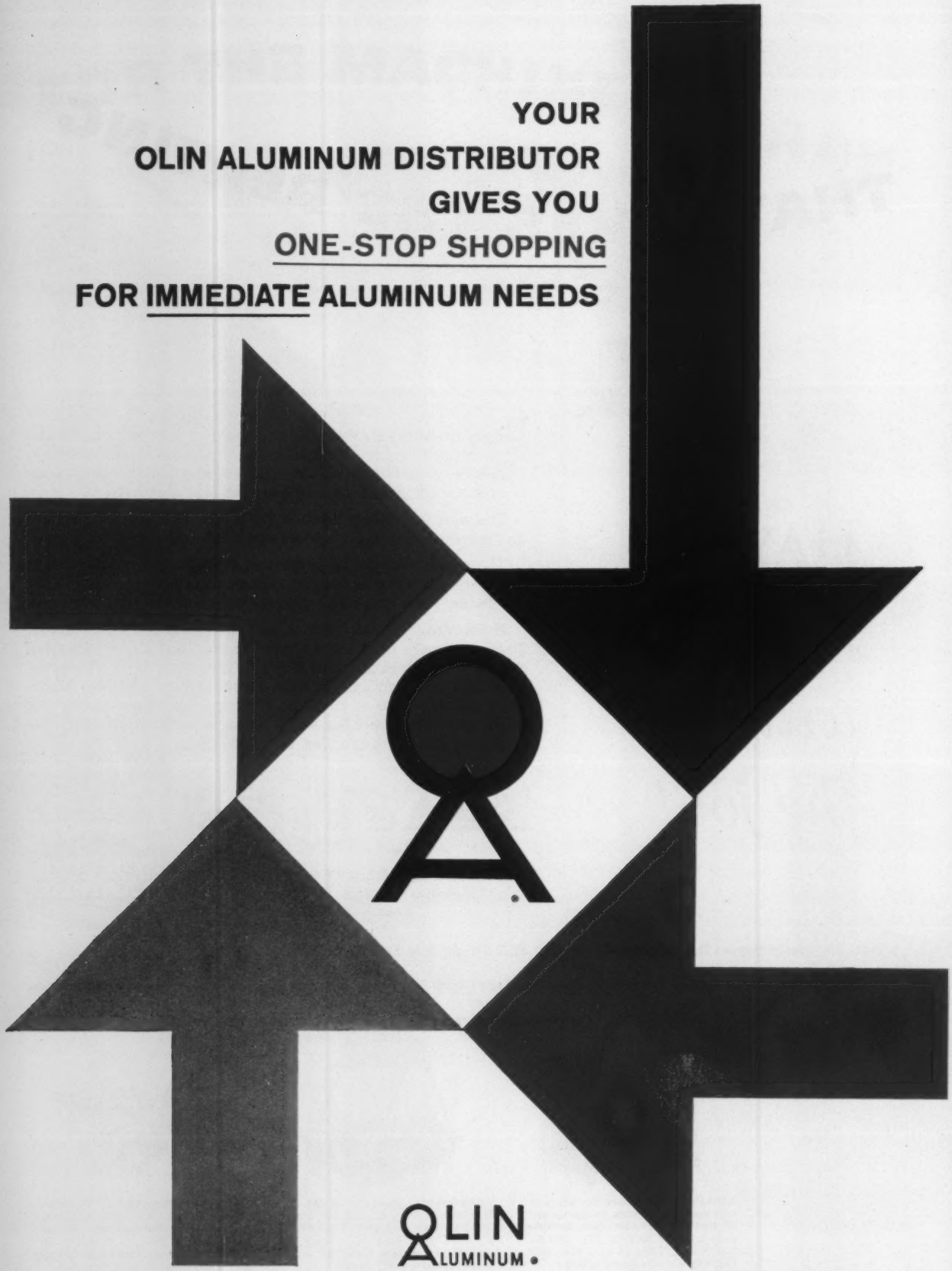


CORROSION. Baskets made of HASTELLOY alloy C used for holding forgings during acid treatment, are still good after 15 months of service. Materials formerly used were replaced every month.



HIGH TEMPERATURE. Turbine wheels in the "hot" ends of diesel engine turbochargers are investment-cast of HAYNES STELLITE alloy No. 31, for service at speeds up to 50,000 rpm. at 1500 deg. F.

YOUR
OLIN ALUMINUM DISTRIBUTOR
GIVES YOU
ONE-STOP SHOPPING
FOR IMMEDIATE ALUMINUM NEEDS



OLIN
ALUMINUM

Olin Aluminum distributors now stock just about any aluminum product you might need. Coiled and flat sheet in common and heat-treated alloys. Over 400 different extruded shapes. Casting alloys. And exclusive Olin Aluminum **cold processed** rod and bar. All in a wide range of alloys, tempers and sizes... all in stock and awaiting your call.

Your Olin Aluminum distributor also stocks **experience**—a free but priceless factor when you want metal in a hurry... metal selection and application advice... tips on fabricating or finishing aluminum. **Make him your metals service center** for both ferrous and non-ferrous products. You'll get:

- **Quick, effective custom-tailored service**
- **Extra plant space by limiting inventories**
- **Technical service backed by Olin Aluminum's metallurgical facilities**
- **Slitting, shearing and roller-leveling service—in most cases**

COIL, FLAT SHEET AND PLATE...ROD AND BAR...EXTRUDED SHAPES...PIPE AND TUBING...CASTING ALLOYS

DISTRIBUTORS FROM COAST TO COAST

Mill Products Distributors

ALABAMA
BIRMINGHAM 12
Atlantic Steel Co.
WOrth 1-2147

CALIFORNIA
BERKELEY 10
A. M. Castle & Co.
THornwall 5-2210

LOS ANGELES 58
A. M. Castle & Co.
LUdlow 9-6611

LOS ANGELES
California Metals Distributing Co.
ADams 2-6216
(rod, bar and extrusions)

LOS ANGELES 22
Jones & Laughlin Steel Corp.
RAymond 3-4581

SAN FRANCISCO 19
A. M. Castle & Co.
ATwater 2-6920

COLORADO
DENVER 1
M. L. Foss, Inc.
KEystone 4-5151

CONNECTICUT
[redacted]

FLORIDA
[redacted]

ORLANDO 1
Caulley Steel & Supply Co.
GArden 5-3528

GEORGIA
ATLANTA 1
Atlantic Steel Co.
TRinity 5-3441

ILLINOIS
CHICAGO
A. M. Castle & Co.
NAtional 5-6411

CHICAGO 39
Guardian Aluminum Sales, Inc.
NAtional 2-5808

CHICAGO 32
Lafayette Steel & Aluminum Corp.
LAfayette 3-7632

ROCKFORD
A. M. Castle & Co.
WOodland 8-2211

LOUISIANA
NEW ORLEANS 9
Woodward, Wight & Co., Ltd.
TUlane 2471

MARYLAND
BALTIMORE 11
Brass & Copper Supply Co., Inc.
BElmont 5-1500

BALTIMORE 24
A. M. Castle & Co.
Dickens 2-4000

MASSACHUSETTS
BOSTON 10
Kelco Metal Products Co.
HUbbard 2-1737

WORCESTER 6
Kelco Metal Products Co.
[redacted]

[redacted]

NORTH KANSAS CITY 5
A. M. Castle & Co.
GRand 1-3666

NEW JERSEY
NEW BRUNSWICK 1
Morrison Steel Co.
CHarter 7-8400

NEW YORK
BUFFALO 17
Seneca Steel Service, Inc.
RIverside 7920

SYRACUSE 1
Murphy & Nolan, Inc.
GRanite 4-2437

NORTH CAROLINA
CHARLOTTE 1
Brass & Copper Supply Co. of Carolina, Inc.
FRanklin 5-5508

OHIO
CINCINNATI 9
Cincinnati Steel Products Co.
TRinity 1-4444

CLEVELAND 13
Midwest Aluminum Supply Corp.
PRospect 1-8240

CLEVELAND 5
The Universal Steel Co.
VUlcan 3-4972

DAYTON 1
Miami-Dickerson Steel Co.
CLearwater 3-6121
(rod, bar, extrusions)

OKLAHOMA
OKLAHOMA CITY 8
McCormick Steel Co.
MElrose 4-1492

PENNSYLVANIA
[redacted]

KNOXVILLE 18
Steel Supply Co.
MYrtle 1-1163

TEXAS
CORPUS CHRISTI 1
McCormick Steel Co.
TUlip 4-0305

DALLAS 34
McCormick Steel Co.
CHapel 7-3104

HOUSTON 20
McCormick Steel Co.
ORchard 2-6671

LUBBOCK 1
McCormick Steel Co.
POrter 2-8793

WASHINGTON
SEATTLE 4
A. M. Castle & Co.
MAin 3-0565

WISCONSIN
MILWAUKEE 3
A. M. Castle & Co.
Mitchell 5-3400

Casting Alloy Distributors

ALABAMA
ANNISTON 1
L. A. Draper Metals, Inc.
ADams 7-3585

CALIFORNIA
LOS ANGELES 23
McGowan Co., Inc.
ANgeles 3-7575

OAKLAND 20
Globolov Metals Inc.
[redacted]

MIDDLEBORO
Bay State Aluminum Co., Inc.
Phone: 1251-W

MICHIGAN
DETROIT 2
Milton A. Meier Co.
TRinity 5-9371

MINNESOTA
MINNEAPOLIS 7
Harry A. Brown Co., Inc.
PArkway 2-6664

MISSOURI
KANSAS CITY 26
Altaw Distributing Co.
CHestnut 1-1337

ST. LOUIS 10
Fischer-Fixman Metal Co., Inc.
JEfferson 5-3481

NEW YORK
BROOKLYN 37
Henning Brothers & Smith, Inc.
HYacinth 7-3470-1-2

OHIO
CLEVELAND 13
Midwest Aluminum Supply Corp.
PRospect 1-8240

CINCINNATI 9
Cincinnati Steel Products Company
TRinity 1-4444

SOUTHWESTERN U. S.
McCormick Steel Co.
(See listings under Mill Prod. Distr.)

Distributors to Mobile

[redacted]

COLUMBUS
Atlantic Steel Co.
TRinity 5-3441 (Atlanta)

ILLINOIS
CHICAGO 7
Kochton Plywood & Veneer Co.
TAylor 9-0800

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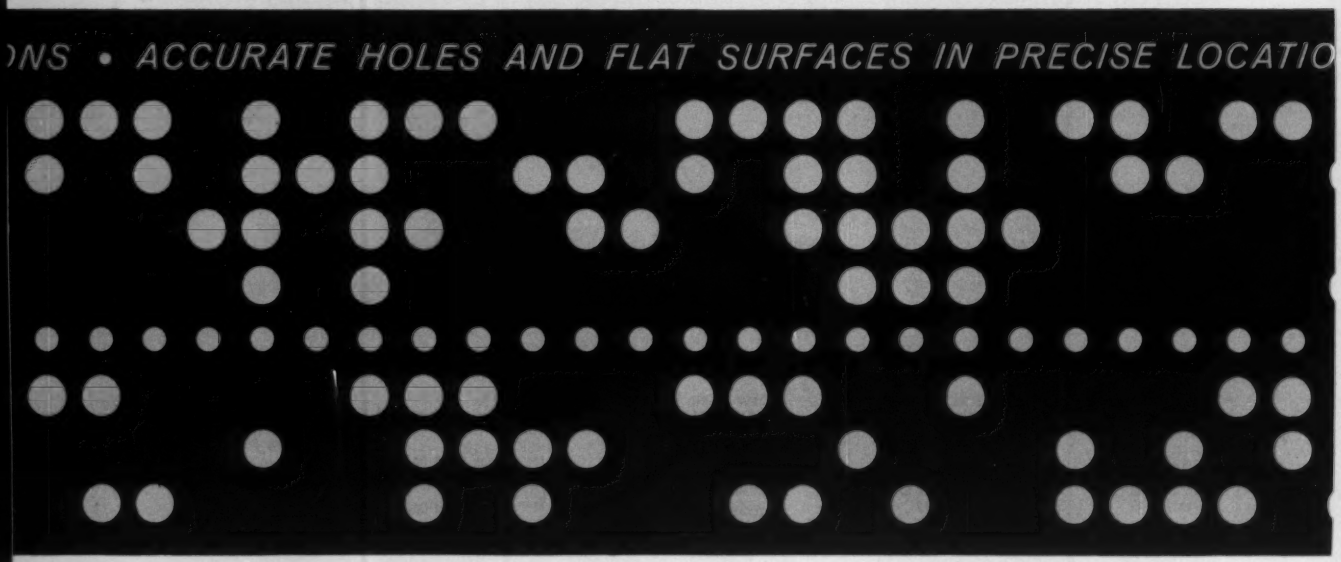
tapac*

tape control system for DeVlieg Spiramatic Jigmils®



Now available for automatic programming of all Spiramatic JIGMILS, Tapac is DeVlieg's own system of numerical control. And it is so simplified, a tool engineer can master the programming technique in 3 to 4 hours.

Designed to make full use of JIGMIL'S inherent accuracy and precision, Tapac is a point-to-point system for automatic measuring, positioning and cycling complete parts programs utilizing 1" eight-channel standard punched tape input. Automatic functions include sequential or simultaneous positioning of vertical and horizontal slides, spindle depth control cycling and control of spindle speeds and feeds. *Automatic positioning repeats to within 0.0001".* The control system is comprised of simple plug-in electronics and standard proven components.

Come to Fair Street and see the Tapac system of automatic tape control for jigless boring and machining in our own production operations. Its accuracy, precision and flexibility will work equally well for you.

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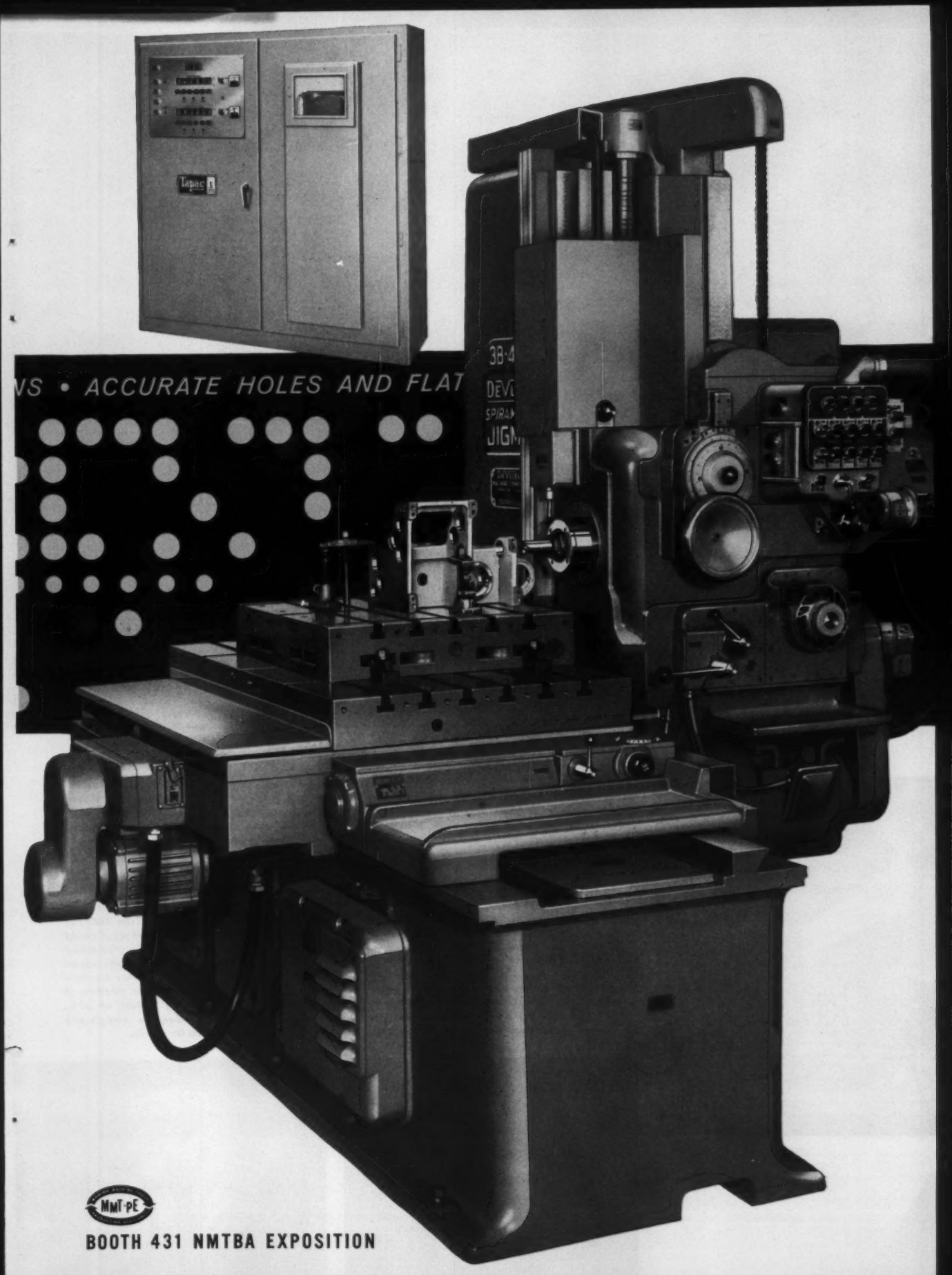
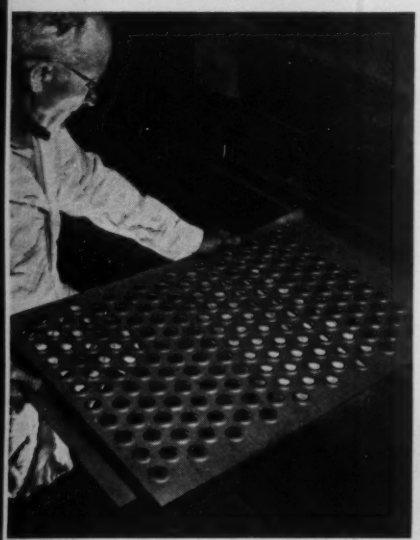


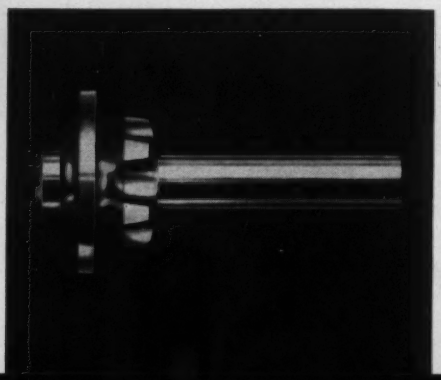
BOOTH 431 NMTBA EXPOSITION

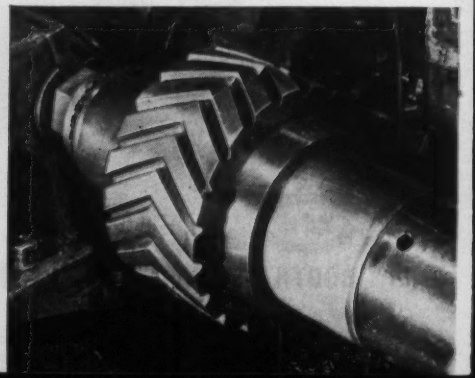


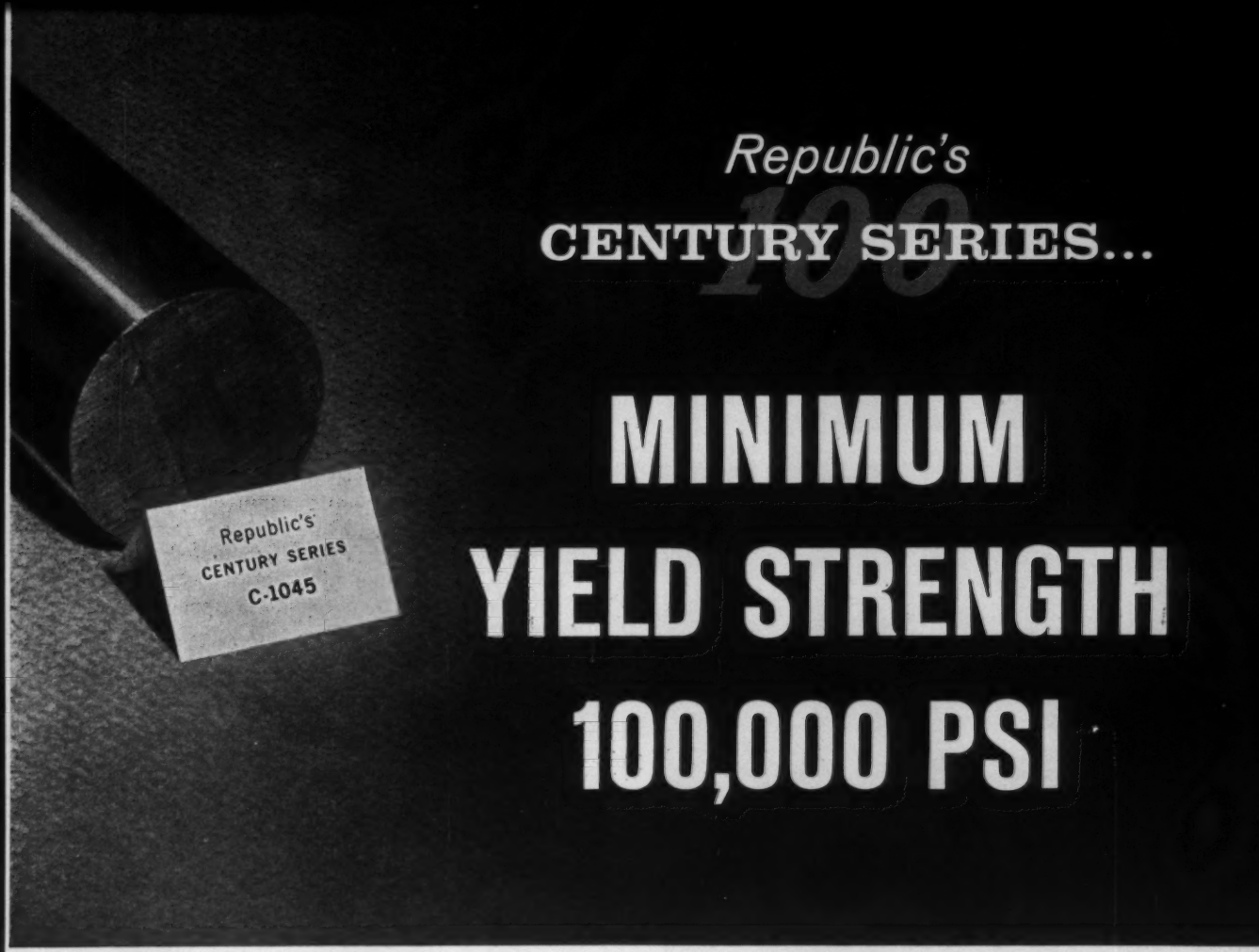
HUMIDIFYING AND DEHUMIDIFYING UNITS: Kathabar® Division, Surface Combustion Company, uses Republic Galvannealed Sheets to assure top performance at minimum cost. In this application, Galvannealed Sheets minimize corrosion problems. In addition, the uniform zinc coating is undamaged by forming operations. With Galvannealed Sheets, you shear, blank, pierce, form, flange, solder, deep draw, or bead with ease. Return the coupon for data.

ONE-PIECE VALVE STEMS: National Acme Company uses Republic ENDURO® Type 303 Cold Finished Stainless Steel for Hyseal Valve Stems used in new American-Standard single-lever mixing faucets. These valve stems are completed in a single setup. Ten operations including a multiple end drilling of six holes on a 15° angle are performed in 12 seconds. For information on the more than 40 standard types of stainless steel available from Republic, mail the coupon.

HEAVY-DUTY HERRINGBONE GEARS: Philadelphia Gear Corporation uses Republic Type 4140 Hot Rolled Leaded Alloy Steel. Bars are rough turned on a lathe and heat treated to a 300 Brinell prior to gear cutting. Leaded alloy and carbon steels are available in almost every standard analysis and many specials. The addition of lead increases machinability as much as 25%. Heat treating assures adequate strength and toughness. Send coupon for details.







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To save time and money in steel parts production, choose from this family of five grades of high strength, stress-relieved, cold finished steel bars.

Republic's CENTURY SERIES provides varying degrees of machinability. Yet, each grade—C-1045, C-1050, C-1151, C-1141, and C-1144—offers minimum yield strength of 100,000 psi. Better strength/toughness ratios are frequently obtained by selecting one of the lower sulphur, *less expensive* grades. Return the coupon for your free copy of Republic's CENTURY SERIES Booklet.

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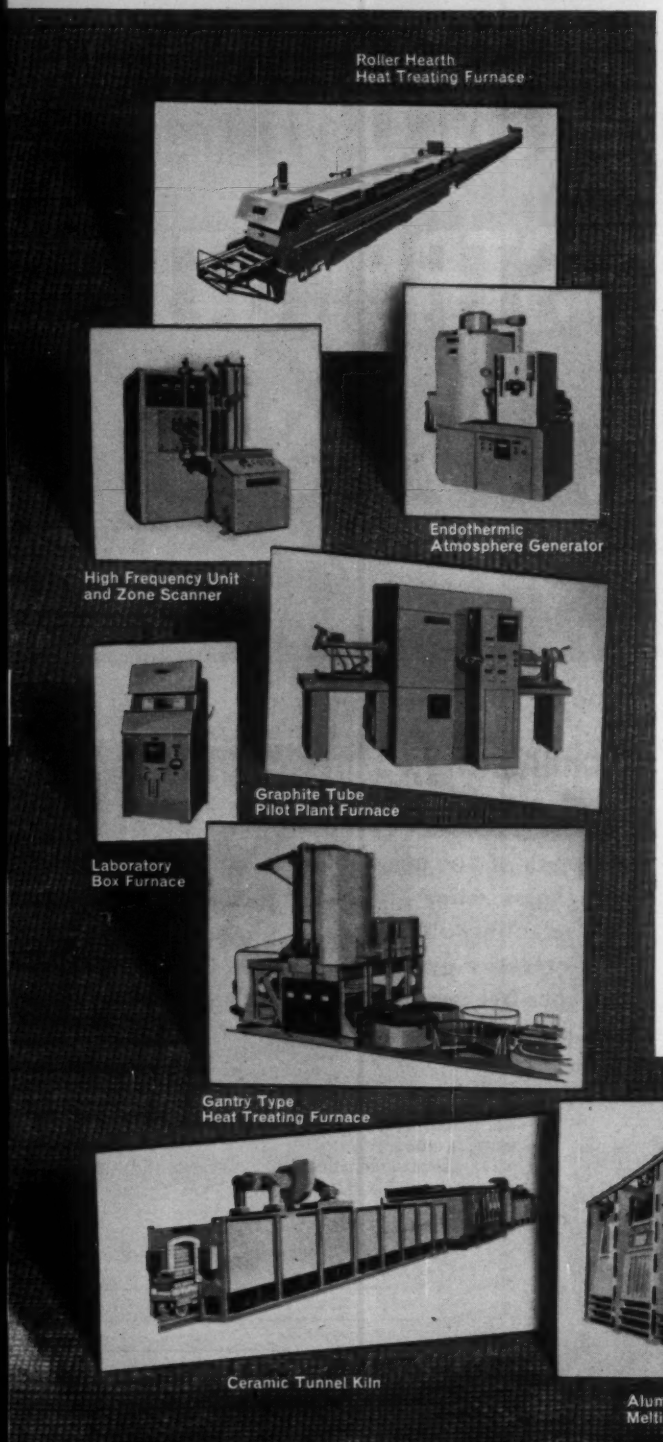
THE BIGGEST INDUSTRIAL HEATING JOB CAN BE ENTRUSTED TO LINDBERG'S *PLUS* DIMENSION IN SERVICE

THERE'S LINDBERG EQUIPMENT FOR EVERY INDUSTRIAL HEATING NEED



These are representative units from complete Lindberg lines in all types of industrial heating equipment.

The plus dimension in service Lindberg offers today can provide a complete answer to any problem requiring the application of heat to industry. Give us your specific requirements for a part or a product and we will develop the right processes, design, engineer and install equipment and facilities.

This service covers broad requirements—from plant layout and construction to automated production lines, or just specially engineered industrial heating equipment efficiently integrated into your production processes. For example, Lindberg Industrial Division has recently completed or is in the process of installing such varied projects as:

- Complete plant layout and equipment for brazing honeycomb
- Complete installation for heat treating raw aluminum products including furnaces, foundations, roof and lighting
- A fully automated production line for heat treating plow shares
- Two large ceramic kilns embodying a new concept of making high-refractory bricks
- Complete, automated production line for enameling and drying hot water heaters

You obtain many advantages from Lindberg. You get the combined skills of what we believe to be the country's finest group of engineers and technicians in the industrial heating field. Our experience covers the whole range of "heat for industry" methods so you can rely on us to recommend the most suitable equipment and processes. You will get your installation from one responsible source, guaranteed to achieve the results you need and ready to go to work at the turn of a switch.

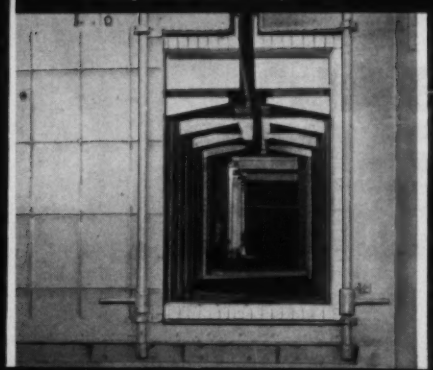
Lindberg Industrial Division, Lindberg Engineering Company, 2321 West Hubbard Street, Chicago 12, Illinois. Los Angeles Plant: 11937 South Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg, Ltd., Toronto.

This Lindberg installation at Stewart-Warner Corporation, Indianapolis, combines (1) Pre-heat Furnace (2) Holding Furnace and (3) Lindberg-Upton Salt Bath Furnace.

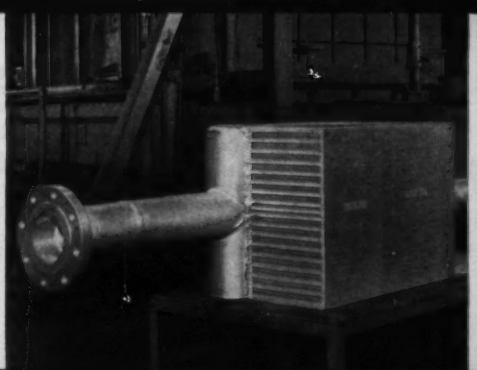
LINDBERG SUPPLIES COMPLETE INSTALLATION FOR DIP BRAZING ALUMINUM HEAT EXCHANGER CORES

Brazing large aluminum plate-and-fin heat exchanger cores requires close tolerances and precise controls. Stewart-Warner Corporation, Indianapolis, chose Lindberg Industrial Division to design and install the right equipment to perform this exacting process efficiently and economically. The main unit, shown above, combines Lindberg Preheat and Holding Furnaces and Lindberg-Upton Salt Bath Furnace. Cores are brought to the desired temperature, moved to holding furnace section, then lowered into the salt bath. Automatic controls maintain required salt bath temperature to extremely close limits. Brazed cores are raised to holding furnace for drainage, moved through a cooling chamber, steam cleaning booth and five dip rinse tanks for thorough cleaning. This installation is another example of the complete design, engineering and installation service Lindberg Industrial Division offers industry. Whenever you have a product or process requiring the application of heat, consult your local Lindberg Field Engineer, (see your phone book) or write us direct. Lindberg Engineering Company, 2452 West Hubbard St., Chicago 12, Illinois. Los Angeles plant: 11937 South Regentview Ave., Downey, California. In Canada: Birlefco-Lindberg, Ltd., Toronto.

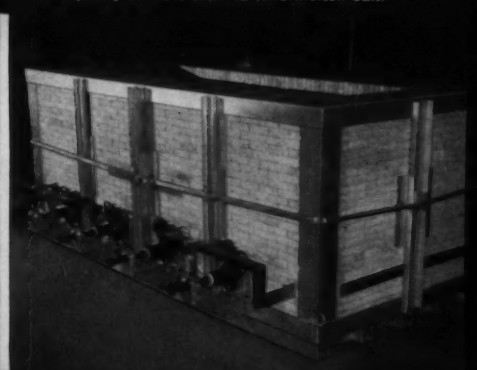
Design of unit permits convenient movement of cores through pre-heat (foreground) to holding section (at far end).



The aluminum heat exchanger cores being brazed in the unit have heat transfer surfaces of 8000 sq. ft. or more.



Lindberg-Upton Salt Bath Furnace in unit features exclusive Graphite "Continuing" Electrodes, and has a capacity of more than 12 tons molten salt.



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And today, more and more fabricators of stainless trim and functional parts specify Uniloy for improved formability and product quality. Call Universal-Cyclops for Uniloy Stainless Steel in the exact grade and finish you need.

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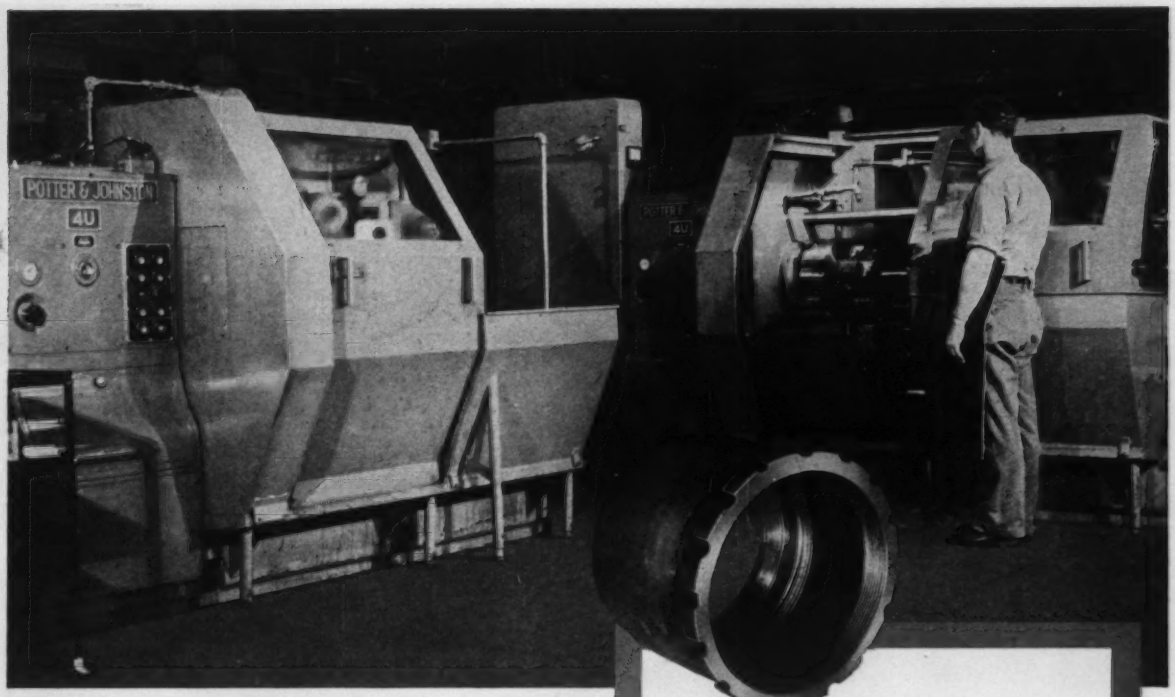


"MACHINING TIME CUT 50-75%

...when we re-equipped with Potter & Johnston® Automatics!"

The world's oldest and largest producer of coal mining machinery, Joy Manufacturing Company, of Pittsburgh, Pennsylvania, was looking for a faster, more economical way to machine a variety of components. After a thorough investigation, which included time estimates for machining 12 different components, 2 Potter & Johnston 4-U Automatic Turret Lathes were selected over several competing makes. Among other factors, the P&J Machines were chosen, because their sturdier construction and greater power meant more metal removed faster, because their 6-face turrets and 2 cross slides provided greater multiple tooling capacity, and because fully automatic operation made it possible for 1 man to operate both machines. On-the-job results have amply justified Joy's decision. For example, machining the typical component shown here, previous time of 22.2 minutes has been reduced to 11.6 minutes using only one P&J Automatic and 5.9 minutes using both machines operated by one man!

Potter & Johnston Automatics helped this manufacturer save time and money—and they can do the same for you! Call the Pratt & Whitney Branch Office in your area and ask one of our Machine Tool Specialists to recommend a production plan for your specific needs. If you prefer, write direct, outlining your requirements. Pratt & Whitney Company, Inc., 10 Charter Oak Boulevard, West Hartford, Connecticut.

JOB FACTS:

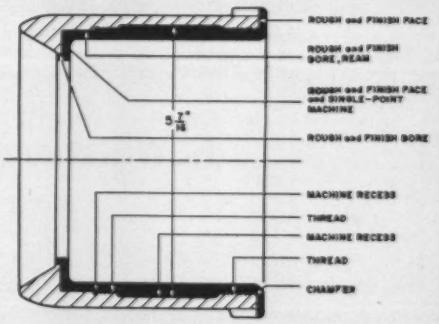
PART: Headlight Bell

MATERIAL: Malleable Iron Casting

REQUIRED: 11 roughing and finishing cuts: boring, reaming, facing, undercutting, grooving, tapping.

THE MACHINES: Two P&J 4-U Automatics operated by one man.

THE RESULTS: An accurately machined part completed every 5.9 minutes.



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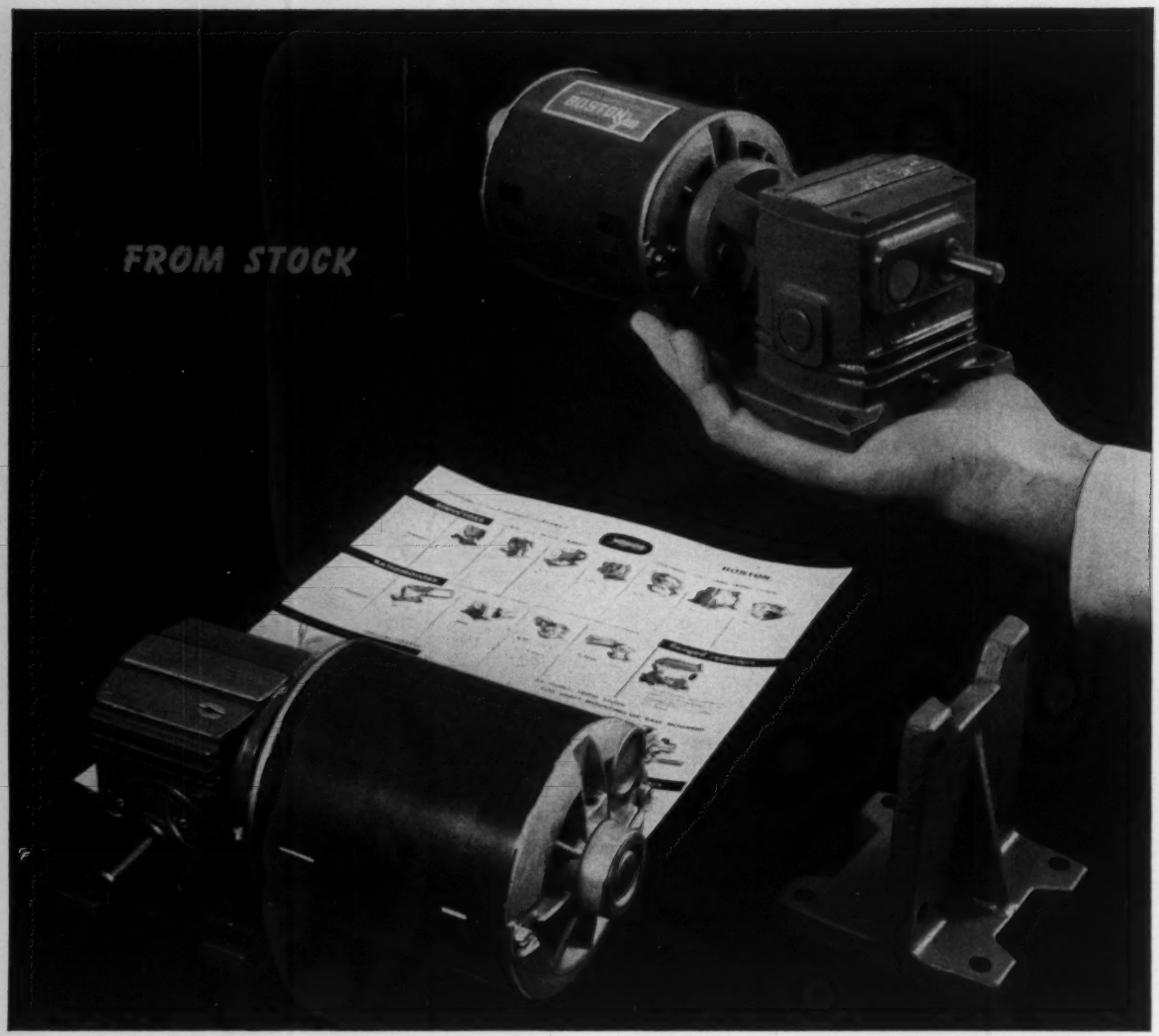

THE NEW M109 Ratiomotor (foreground) for horizontal right angle drives is furnished with 1/20 hp or .035 hp motor. Output speeds range from 43.8 to 350 RPM. New standard mounting bracket shown permits easy mounting in many positions. The NEW MW109 (in hand), for horizontal parallel drives, is also furnished with 1/20 hp or .035 hp motor. Output speeds range from 1.9 to 70 RPM.

NEW Ratiomotors meet demand for BOSTON Gear efficiency in "pint-size" power packages

Now, you can get BOSTON Gear quality and lasting economy in speed reducers for drives as low as .035 hp. Two new units, designed for space-saving, provide a wide range of output speeds.

When you need worm-geared reducers, you'll find any type and ratio you want in the big line of over 1600 BOSTON Gear 100 Series Reductors and Ratiomotors . . . and you can get it FROM STOCK. Catalog No. 57, with the NEW PRODUCTS Supplement, lists full information. Get your copy. Boston Gear Works, 72 Hayward St., Quincy 71, Mass.

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Ask Distributor for NEW PRODUCTS SUPPLEMENT to Catalog No. 57

CALL YOUR NEARBY BOSTON Gear® DISTRIBUTOR

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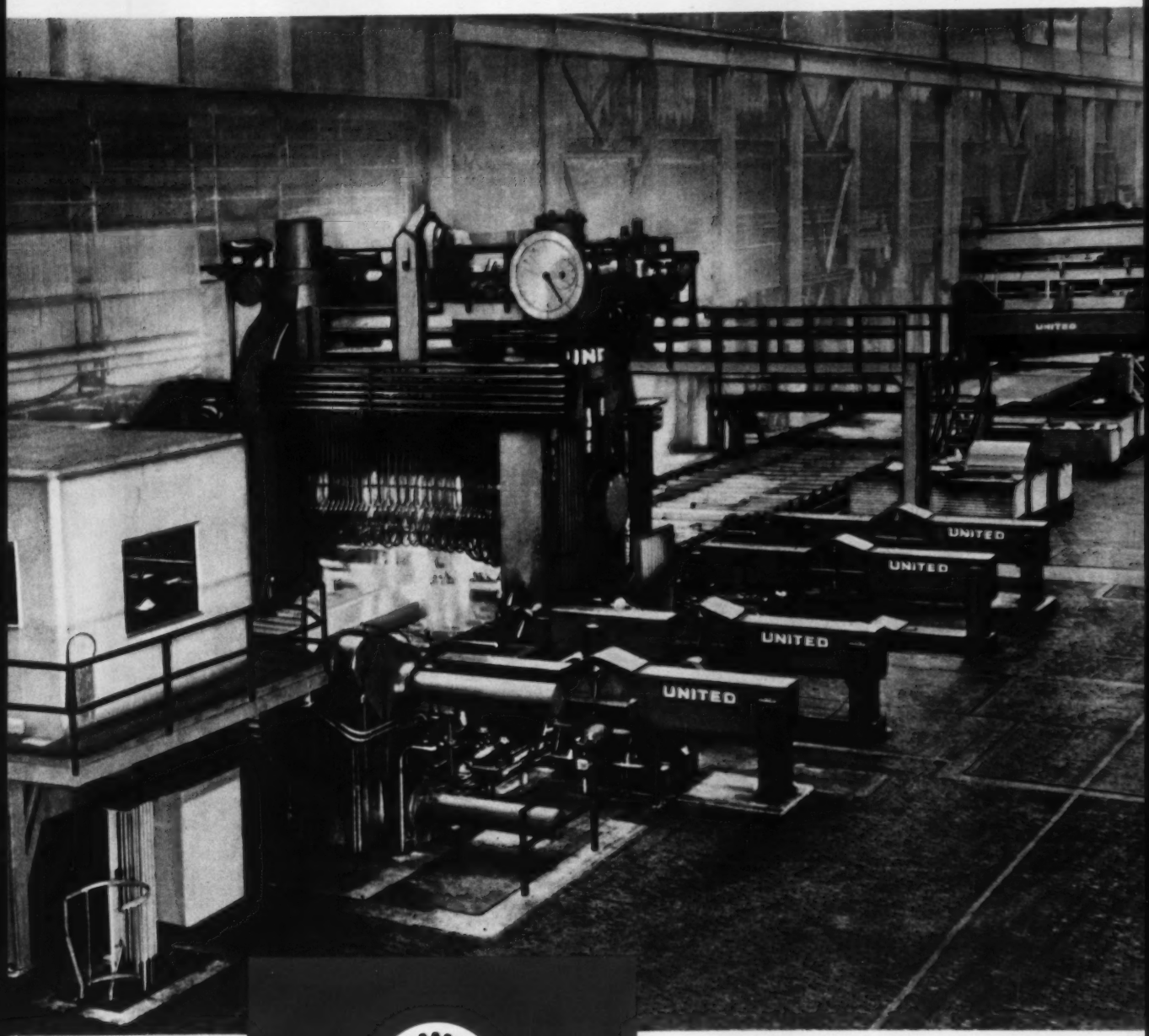

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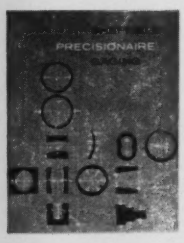
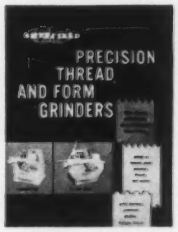


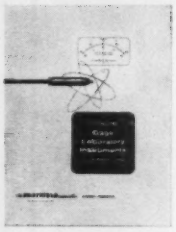
Air Gaging
Precisionaire® Gaging Handbook, describes full Precisionaire instrument line; standard & special air gaging equipment. 48-pp. Catalog SPG-160.

Ultrasonic Machining
Sheffield-Cavitron Machine Tools; specifications, applications, tooling; illustrates principles and job applications. 16-pp. Catalog CAV-759.



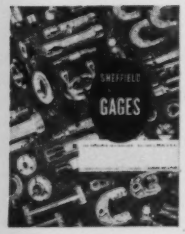
Thread and Form Grinding
Covers Sheffield Models 101 and 103 for tool room and production. Shows variety of Crushtrue® applications, attachments. 12-pp. Catalog TFG11-59.

X-Ray Thickness Gages
Describes broad applications of Measuray® non-contact X-ray gages for metals, plastics, paper, etc.—materials in motion. 16-pp. Catalog MY-1-60.



Gage Laboratory Instruments
Guide to planning a gage laboratory, plus facts on all Sheffield electronic instruments, visual gages, etc. for the complete lab. 20-pp. Catalog IN-1-57.

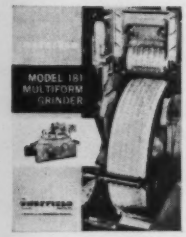
Automatic Gaging and Assembly
Review of Sheffield's building-block concept of automatic gaging and assembly machines — basic components, examples. 12-pp. Catalog AU-57-12.



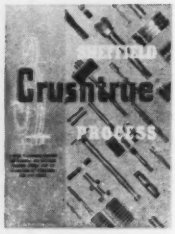
Limit-type Gages
Easy to use complete catalog on A. G. D. and special plugs, rings, snaps, thread checking—wealth of valuable information. 40-pp. Catalog LTG-59.

Visual Gages
Presents basic features of Sheffield "shop proof" design, shows versatility of use, range of amplifications and accessories. 20-pp. Catalog 501-52.

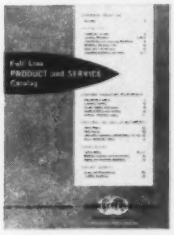
Eli Whitney Metrology Lab.
Master measuring machines, instruments, other equipment; special construction of laboratory and calibration services. 20-pp. Catalog ML-1-56B.



Multiform Grinder
Presents features & specifications of Sheffield Model 181 Grinder with Crushtrue® wheel dresser. Shows examples of jobs. 10-pp. Catalog FG-181-260.



Sheffield Crushtrue® Process
How Sheffield Crushtrue® devices make it possible to produce threads and forms more accurately, at a higher production rate. 12-pp. Catalog CR-355.



Condensed Product and Service
85 illustrations: Covers Sheffield's gages, grinders, assembly machines, x-ray gages, ultrasonic machine tools and lab. services. 20-pp. Catalog GC-9-57.

Drop us a card or note with the numbers of the catalogs you want, or clip and mail this ad with the items checked.

name _____

firm _____

address _____

The **SHEFFIELD** *Corporation* *Dayton 1, Ohio*

A subsidiary of the Bendix Corporation

Gages, Measuring Instruments, Automatic Gaging & Assembly Systems • Machine Tools • Contract Mfg.

stainless steel

No other metal has the strength, beauty and versatile qualities that serve you so well today and promise so much for tomorrow.

There is nothing like stainless steel for HOMES AND HOME PRODUCTS

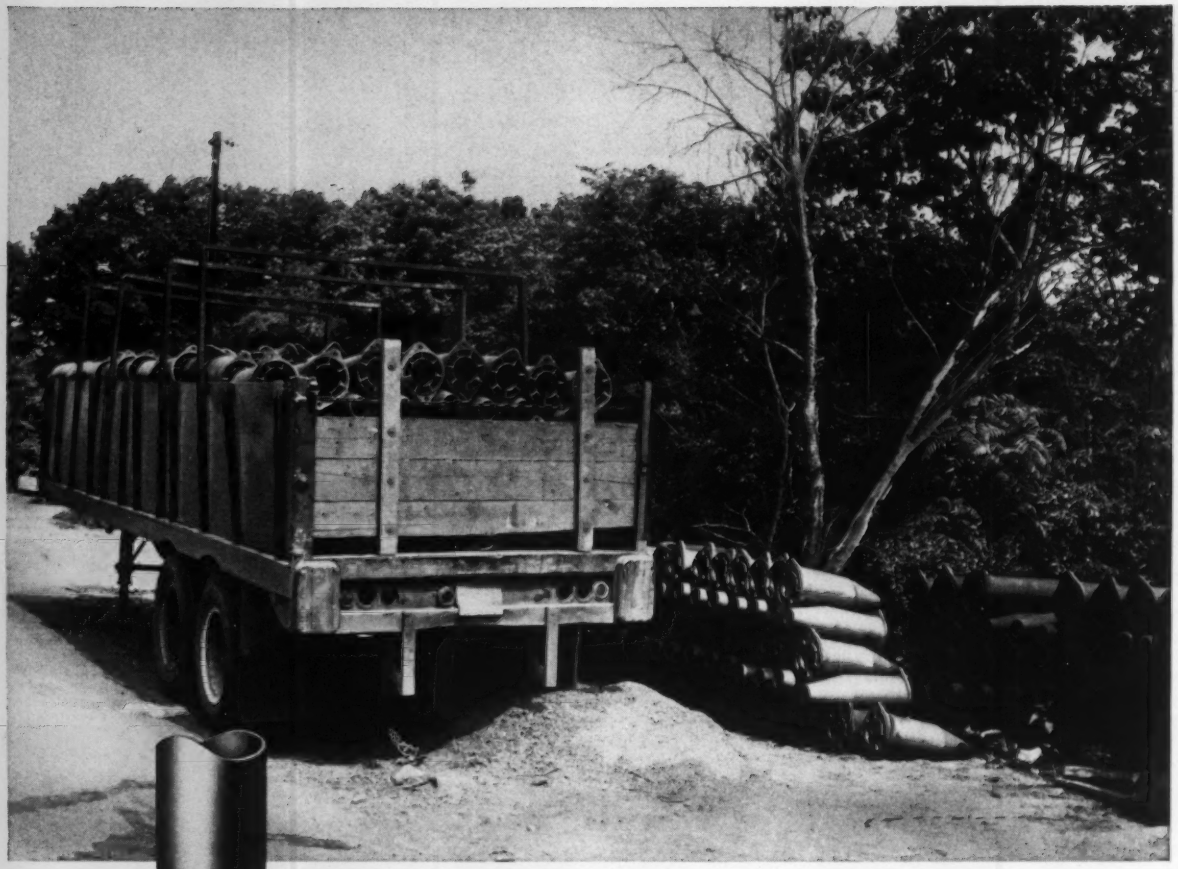
McLouth Steel Corporation,
Detroit 17, Michigan

Manufacturers of high quality Stainless and Carbon Steels

Look for the **STEELMARK** on the products you buy.

Stainless Steel

McLOUTH STAINLESS STEEL



TYPE
C10
CYCLO-TRELL

Ammunition for the war on dust!

Fighting dust is the purpose of this load of Cyclo-trell C10 "shells." ■ Cyclo-trell units for process gas or air cleaning in steel mills, refineries, paper, cement or chemical plants give you high efficiencies. ■ Engineered to fit each specific job, Cyclo-trell units are available in a wide range of sizes and types including C10, C24, IC (Involute Cyclo-trell) and ICL (Involute Cyclo-trell, Lined). ■ Why not let us consult with you on your specific dust collection problems? For further information, write for Bulletin 300 which describes several applications in detail.

Research-Cottrell

RESEARCH-COTTRELL, INC., Main Office and Plant: Bound Brook, N. J.
Representatives in principal cities of U.S. and Canada

RESEARCH COTTRELL INC. TRADE MARK RC-208

BULLARD

DYNATROL*

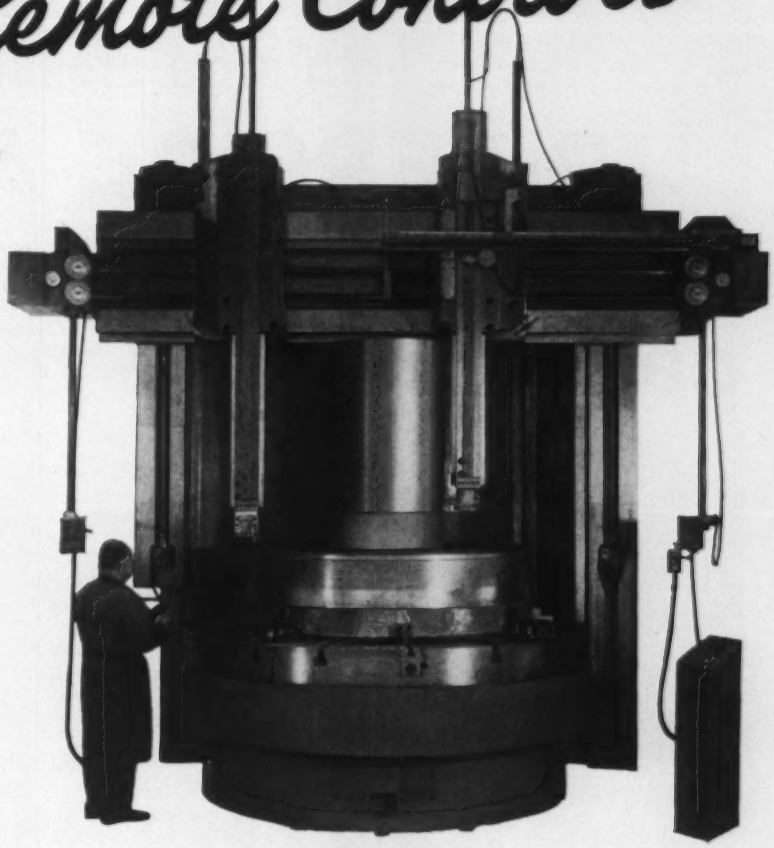
VERTICAL BORING AND TURNING MILLS

FEATURE *Simplified Remote Controls*

Within the span of a man's hand, utilizing a stationary and portable pendant, are all the controls necessary to actuate these modern giant mills. No climbing or clamoring for buttons or levers – every function of the machine is controlled from a position most advantageous to the operator.

The stationary pendant controls feed rate, table speed, starting and stopping of the table – also table jogging.

The portable pendant controls direction of heads in traverse or feed for either horizontal, vertical or 45° travel.



108" Dynatrol Vertical Boring and Turning Mill
Capacity – Maximum swing 120"; Height under rail – 80"; Ram travel – 60"; Table speed ranges, optional, Low 1.4 to 50; Int. 2.1 to 75; High 2.8 to 100; Feed rates infinitely variable from 0-500; available with Plain Table, or 4-jaw independent built in chuck.

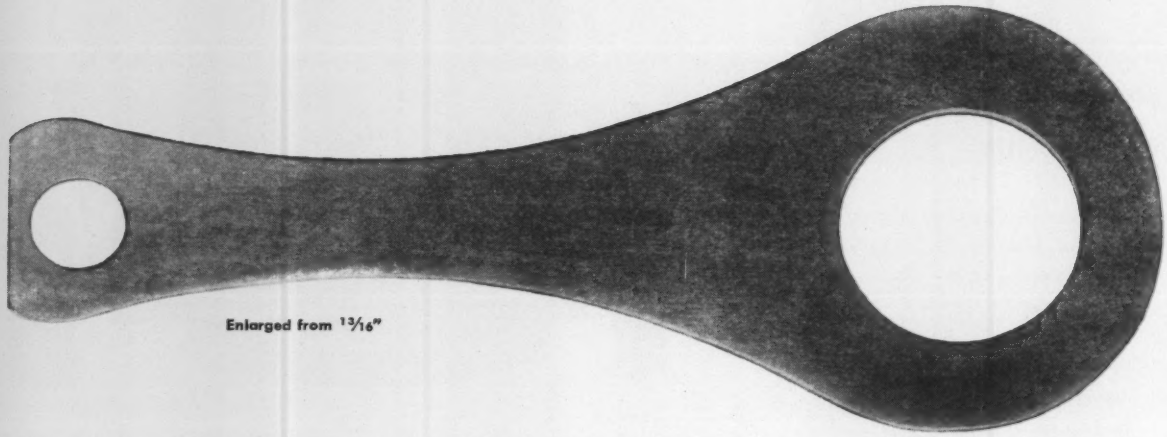
This control system, and other revolutionary new Dynatrol features, enable the operator to utilize modern cutting tools at maximum speeds – cut to closer tolerances with superior finish – remove more metal per hour and keep the tool in the cut for more hours per shift. Table diameters of sizes 92, 108, 124 and 144 inches are available. Write or telephone for detailed catalog and complete information. The Bullard Company, Bridgeport 9, Conn., telephone Edison 6-2511.

* Trade Mark

. . . YOU CAN'T BEAT A BULLARD . . .

They're both strip products, but . . .

RIVERSIDE-ALLOY continuous casting can make the difference!



Enlarged from 1 3/16"

Profitable strip products or expensive rejects . . . the difference is *how* your alloy was cast. *Exclusive* Riverside-Alloy *continuous casting* methods produces the ideal metal . . . no impurities, no gas holes . . . but a dense, homogeneous casting, 100 per cent fault-free.

Result: Riverside-Alloy strip, rolled from Riverside-Alloy castings, is the finest you can buy . . . never a hidden defect to show up in thin gauges, under severe die forming.

Next order, specify Riverside-Alloy . . . profit from the benefits of continuous casting . . . eliminate your reject problems. *Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, N. J.*

RIVERSIDE-ALLOY METAL DIVISION PORTER **H. K. PORTER COMPANY, INC.**

PORTER SERVES INDUSTRY with steel, rubber and friction products, asbestos textiles, high voltage electrical equipment, electrical wire and cable, wiring systems, motors, fans, blowers, specialty alloys paints, refractories, tools, forgings and pipe fittings, roll formings and stampings, wire rope and strand.

WHO FORGES THE TOUGH ONES?
and dynamic balances them, too?

To further National Forge's reputation for producing precise forgings, we've installed one of the largest, most accurate dynamic balancing machines in use. Our American-Trebel has a 33,000-pound, 60-foot capacity.

Pictured on the machine is a 42 ft. propeller shaft that has been forged, machined, and hollow bored—all operations done in our National Forge plant NF specialists are shown balancing this gigantic 15,500 lb. shaft.

If you want one responsible source to produce and control the quality of your forgings. .from melting and forging the steel through machining and dynamic balancing... call National Forge. Let us quote on your next job—and *prove* "who forges and dynamic balances the tough ones . . . best!".

NF

NATIONAL FORGE COMPANY
IRVINE, WARREN COUNTY, PA.

NF-59-04

For information on the "tough' ones and the machinery that makes them best, write for Bulletin NF 1.

CF&I WIRE HELPS PACKAGED for YOUR PRODUCTION

"CF&I Stem-paks cut machine loading time 80%... give us an extra hour of production every day," stated Mr. Frederick Voos, Plant Superintendent, Risdon Manufacturing Co., Waterbury, Conn.

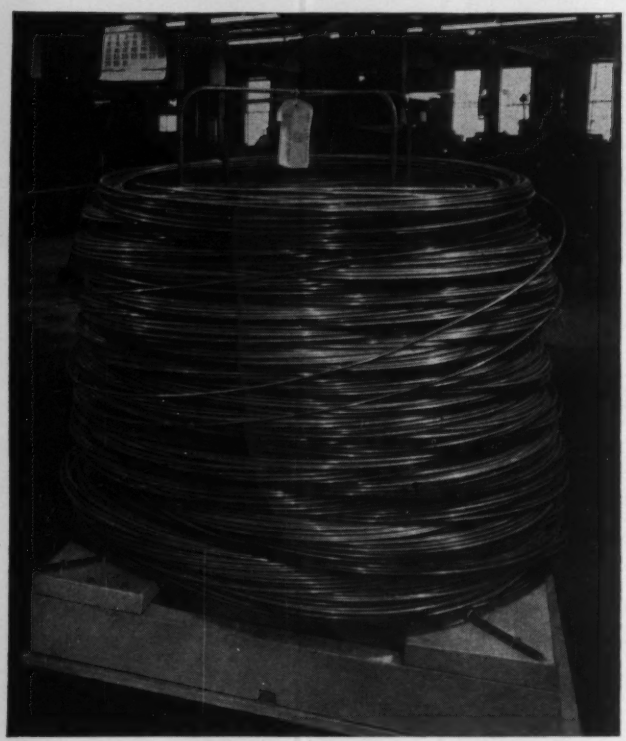
PROBLEM

1. "Our specially designed machines *were* fed wire from coils averaging 150 lbs. Because of the small size, frequent machine loadings were necessary. Each time, the coils had to be loaded by hand and the bindings clipped, after which the wire was guided through the straighteners before entering the machine. We were losing valuable production time due to excessive machine downtime," explained Mr. Voos.

SOLUTION

1. "Our Purchasing Department called a CF&I salesman who carefully examined our operation and recommended that we switch to CF&I Stem-paks which hold up to 1,000 lbs. of one continuous length of wire. Each Stem-pak feeds a machine for an average of one to two days... a production time equal to using seven coils with set-ups in the past.

"Stem-paks give us approximately an extra hour of production per day on each machine," Mr. Voos pointed out. "A Stem-pak can be set up in one-fifth of the time required for the seven coils of wire formerly used... *a saving of 80% on loading time.* The extra hour of production represents a 12½% increase in the operator's production time."



CF&I Stem-paks are delivered on pallets for fast unloading and easy in-plant handling by fork trucks.

PROBLEM

2. "Part of our operation required the use of wire that was free from rust, grease or dirt. Too often, unprotected coils would collect dirt in transit or storage.

SOLUTION

2. "CF&I Fibre Drums are an ideal answer to the problem of unclean wire. The sturdy Fibre Drum has a metal cover and locking band which seals the drum, protecting the wire from grime and from corrosive elements. In addition, Fibre Drums hold up to 600 lbs. of one continuous length of wire which enables us to run our machines for a longer time than when we used small coils."

Stem-paks and Fibre Drums are just two of nine wire packages that CF&I offers to help make your operation more efficient and economical. When you order from

INCREASE PRODUCTION 12½%

at Risdon Manufacturing Co., Waterbury, Conn.

Risdon Mfg. Co. also uses CF&I Fibre Drums, which hold up to 600 lbs. of wire, for special operations. The sealed Fibre Drums protect the wire against rust and contamination during transit and in-plant storage. Note how closely the Fibre Drums can be placed to the machine and how evenly the wire pays off.

A Stem-pak is easily placed in storage alongside Fibre Drums. No messy storage problems... no chance of coils becoming tangled. Inventory of this neat, compact storage set-up is a quick, simple counting job.

CF&I, you can specify wire *packaged for your production* to give you one or more of these benefits:

- **less downtime through extra-long continuous lengths of wire**
- **compact storage and simplified inventory control**
- **fast unloading and in-plant handling**
- **assured cleanliness of the wire**
- **smooth pay off of the wire**

A CF&I salesman will be glad to assist in selecting the *right* wire package for your operation. There's no charge for this service, so call our nearest sales office today.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco San Leandro • Seattle • Spokane • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I OFFICE IN CANADA: Montreal • **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg 7021

Want a Press to Triple Your Forging Output?

We'll build the press for all your forging requirements . . .

Tell us your forging problems and give us your production specifications—we'll do the rest.

Erie Foundry, one of the first companies to automate forging, can provide specially designed *high volume* presses in capacities of 1000 to 8000 tons. Instead of the three machines and nine men formerly required, now you need only one Erie automated forging press and only one operator observer—to triple your present production rate! Trimming, too, can be accomplished in a single production cycle. With billet supply and finished part removal conveyorized, it is possible to achieve a production volume of, say, 1200 track-link forgings per hour.

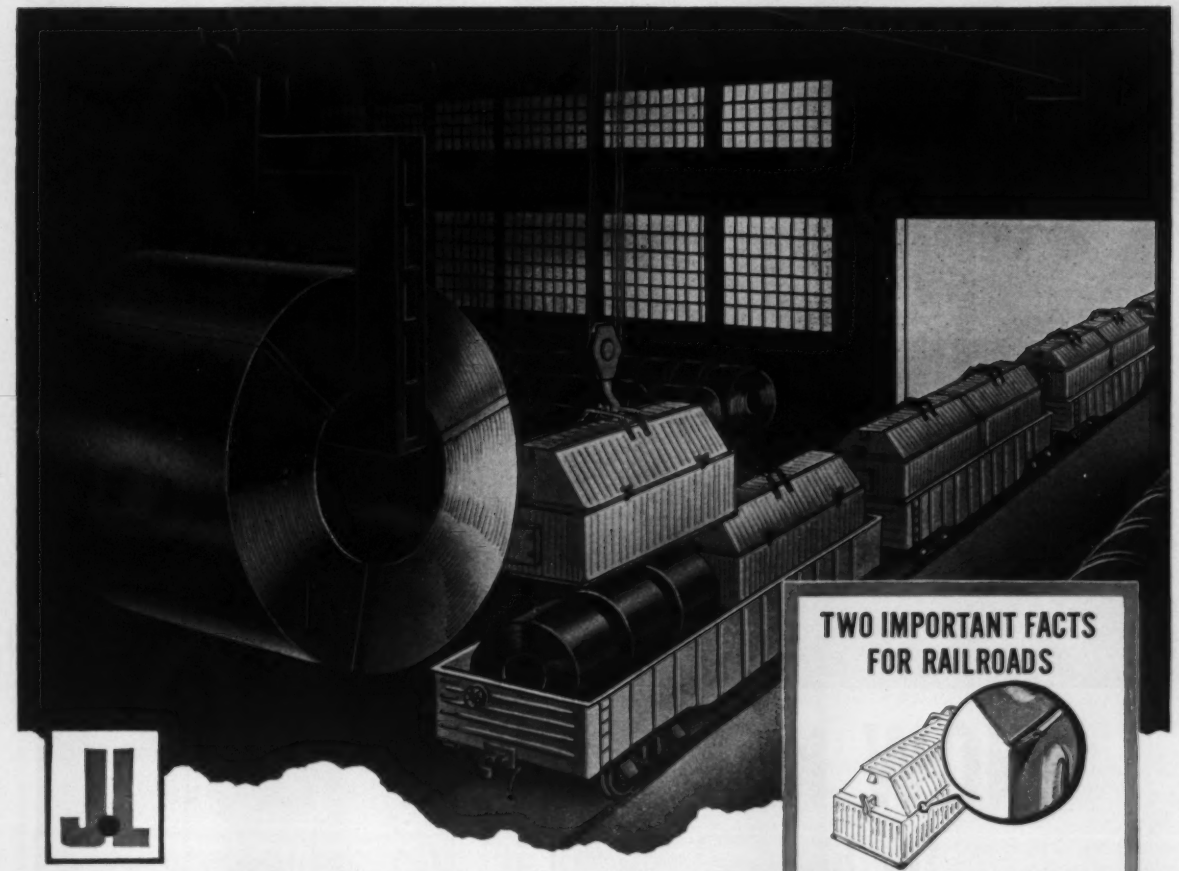
Erie Foundry has a complete line of machines designed for high volume production of such parts as connecting rods, gear blanks, automotive and tractor valves, pinions, track links and wheel hubs.

We would like to discuss application of automated presses to your production requirements. For the complete story, phone or write Mr. R. E. Sanford, Erie Foundry Company, Erie 1, Pa.

ERIE

ERIE FOUNDRY CO.

The world's great name in forging since 1895 EF-59-01



YOCAR HOODS HELP J & L SOLVE SHIPPING PROBLEMS

Use of Yocar hoods on shipments of high quality steel coils provides savings of "$25 to $30" per car loading according to JONES & LAUGHLIN STEEL CORPORATION, ALIQUIPPA WORKS DIVISION, ALIQUIPPA, PA.

Costly dunnage and paper wrappings are eliminated — damage claims show drastic reduction — and the perfectly balanced YOCAR HOODS permit easy positioning with minimum manpower. Positive protection from weather, dirt and vandalism is also provided.

Helping you **SHIP SAFELY AT A SAVINGS** is YOCAR'S goal. Why not do something about your profit-reducing shipping problems? Specify YOCAR protection next time you ship by rail.

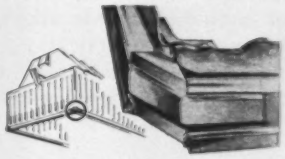
OTHER YOCAR SAFETY DEVICES	**Safe-Cargo Anchor Rails for piggy-back trailers**	**Yocar Safe-Cargo Econo-Guard increases car wall life**
	Yocar 3-section Removable Roofs	**RolLoK Movable Bulkheads**

YOCAR

YOUNGSTOWN STEEL CAR CORPORATION • NILES, OHIO

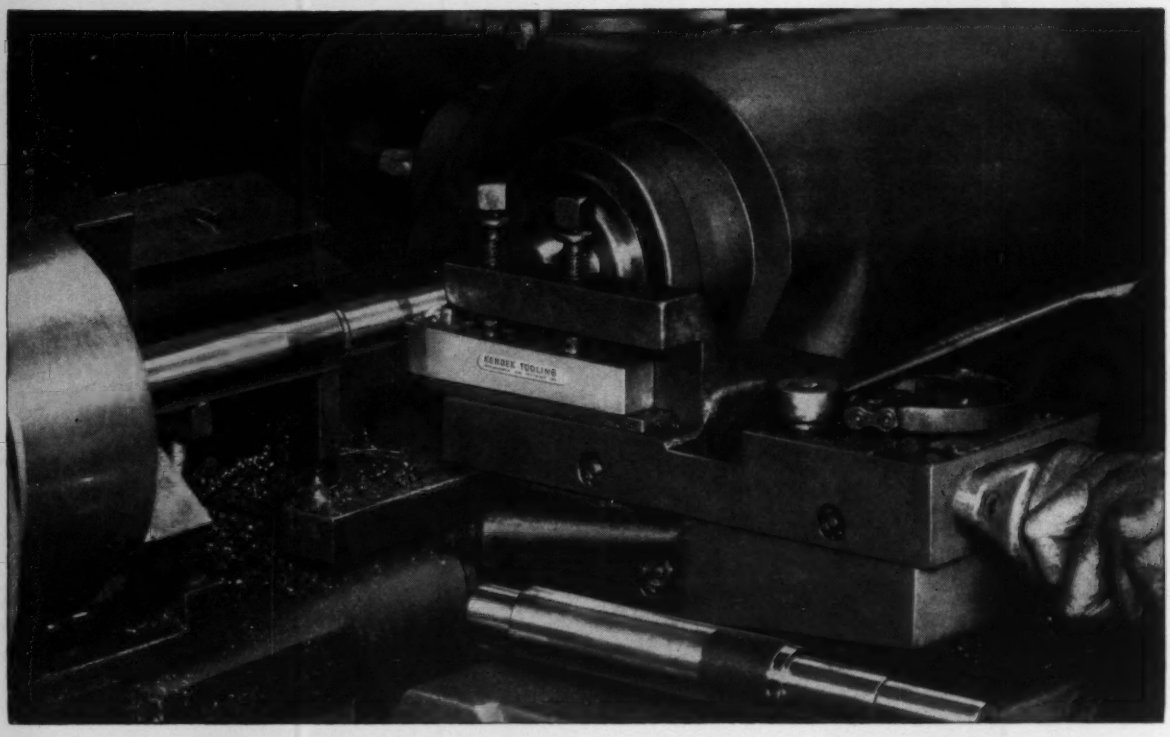
TWO IMPORTANT FACTS FOR RAILROADS

SEAM-LOCK construction eliminates upper welded seams, where water accumulates, insuring weather-tight protection throughout the hood life. Added strength to the entire hood is achieved due to the rigidity and durability of SEAM-LOCK'S design.



CORNER-STRENGTH . . . A new corner construction makes YOCAR hoods the strongest and best constructed hoods available today. Double backing on each corner insures longer service life, for it is here that gondola hoods take the most constant beating from humping and shifting in transit.

Send for new catalog today and see how Yocar can help you solve your shipping problems.



NOW KENTANIUM* K165

. . . for high-speed, precision machining

Through years of research in developing, and experience in successfully applying Kentanium, a series of titanium carbide alloys for high temperature applications, Kennametal now offers K165, a Kentanium Grade for high velocity machining.

K165 has an exceptionally high combination of hardness and strength built-in specifically for machining high temperature alloys of low machinability.

The exceptionally fine surface finish obtainable with K165, 12 rms and better, often eliminates the need for grinding. Such performance is the result of the extremely high edge-wear resistance of K165 and its low "loss of size" characteristic.

The greater combined crater/edge-wear resistance and hardness /strength of K165 permits machining at much higher speeds and with greater accuracy than attainable with conventional tungsten carbide cutting materials. It's a unique composition . . . another contribution to the art of metal-cutting from the research and engineering laboratories of Kennametal Inc.

Check the typical performance record at right. Similar operational data on other types of jobs are available from your Kennametal Representative, or KENNAMETAL INC., Latrobe, Pa.

*Trademark

97299

PERFORMANCE COMPARISON

K165 vs. Ceramic Inserts

Finish Turning Job Illustrated

	K165	Ceramic
Material	1045 steel	1045 steel
RPM	2760	2760
SFM	975	975
Feed	.0073"	.0073"
Depth of Cut	.015	.015
Pieces Per Edge	90	45
Finish		
(a) Using K165:	85 rms after 90th piece	
(b) Using Ceramic:	140 rms after 45th piece	

Note: A 45 microinch finish was produced on the first piece by both cutting materials.

INDUSTRY AND
KENNAMETAL
. . . Partners in Progress

Pick-up for Productivity...

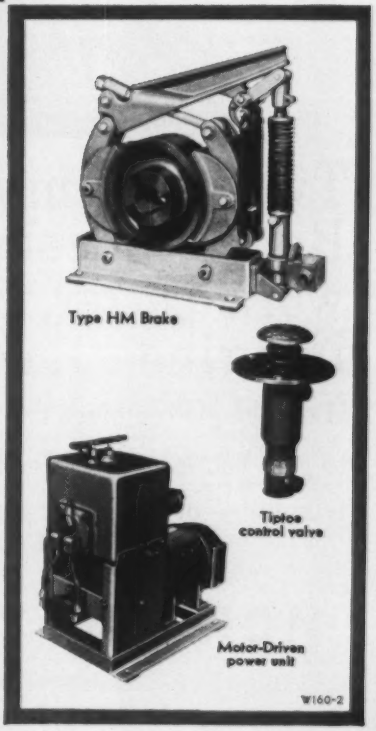
Install
WAGNER *POWERED*
hydraulic brakes on busy cranes

Are shuddering, crane-wrenching stops . . . skid-by-the-spot stops . . . premature stops . . . reducing the productivity of your operation? Put an end to them. Equip your busy cranes with Wagner *Powered* Hydraulic Crane Bridge Brakes.

Wagner *Powered* Braking Systems reduce wear on equipment. Smooth power operation ends bridge motor plugging with its resultant damage to both motors and gears. Brakes don't drag and unnecessarily wear wheels and linings. You get safer, more efficient crane operation. Operators can stop cranes consistently and smoothly . . . productivity is increased, particularly in operations where frequent starts and stops are necessary, where close spotting is required, where heavy equipment is involved.

Your operators perform more efficiently, too, because there's far less fatigue. They can stop cranes with an easy touch of toe on a button while the heel rests comfortably on the floor. Several brakes can be operated from one station.

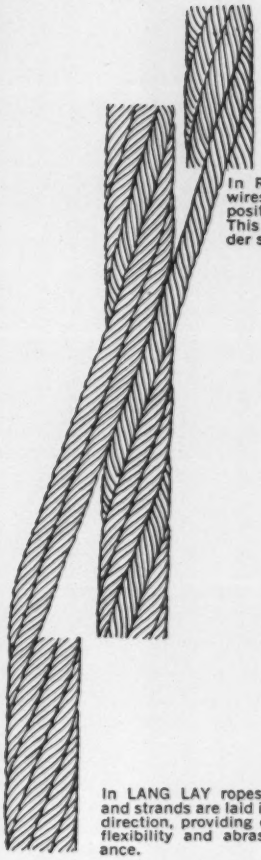
These power units can be added to your present Wagner Hydraulic System. Let your nearby Wagner Industrial Brake Application Engineer show you how easy, fast and economical such an installation can be. There are Wagner branches in 32 principal cities.



Wagner Electric Corporation
6403 Plymouth Ave., St. Louis 33, Missouri

SERVING 2 GREAT GROWTH INDUSTRIES—*ELECTRICAL • AUTOMOTIVE*

HEAVIER OUTSIDE WIRES mean great resistance to abrasion. FINER INSIDE WIRES mean excellent drum winding characteristics.



In REGULAR LAY ropes the wires are laid in a direction opposite to the lay of the strands. This provides stability even under severe operating conditions.

In LANG LAY ropes the wires and strands are laid in the same direction, providing exceptional flexibility and abrasion resistance.

Two ropes in one! Roebling Herringbone® Wire Rope is designed and made to wear better, work better, last longer than you can possibly imagine . . . unless you've tried it yourself!

Herringbone combines two pairs of Lang Lay strands with one pair of regular lay strands to give you maximum flexibility, good stability, mighty strength. Call your Roebling Distributor — or write for details to Roebling's Wire Rope Division, Trenton 2, N. J.

HERRINGBONE WIRE ROPE

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

Another example of National Roll quality control

Elmer Grinder, left, of National's steel foundry discusses chill location with Bill Williamson of the Sales Department.

Roll molds determine life, not just dimensions

Molding techniques for steel rolls are, of course, directed at obtaining a casting with accurate dimensions for economical machining into precise shaped or plain rolls.

But just as important as dimensions —determined by the "sweep" pattern shown above—is the metallurgical function built into every roll mold. Metal "chills" are carefully located to control cooling of the steel in a manner that will produce a roll both metallurgically and physically sound.

Started on paper, the chill layout is translated into a mold of metal and sand under the watchful attention of National's experienced steel foundry personnel. These men know foundry practice. But perhaps more importantly, they know the demands that are made on roll soundness in the customer's mill.

This is a part of National's service which means better rolls for you. It's one of the many reasons why . . .

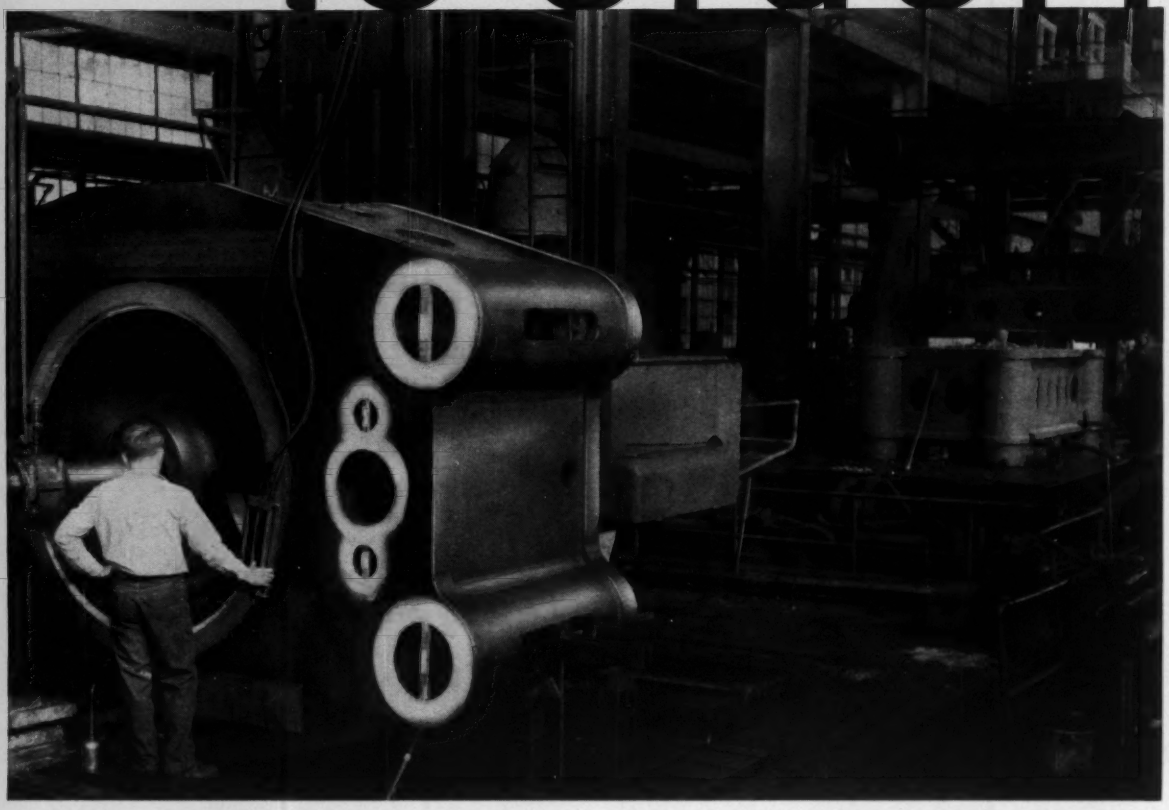
National's the growing name in rolls

NATIONAL ROLL & FOUNDRY DIVISION

GENERAL STEEL CASTINGS CORPORATION, Avonmore (Westmoreland County), Pa.

General Steel Castings Corporation, General Offices: Granite City, Illinois • Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.

Build exactly what you want • • • to order!



VERSATILITY—that's the word for Sun Ship. And that's why you get the machinery or industrial equipment you need, built exactly to your requirements, when you specify Sun Ship.

Consider, for example, the machining operations shown above. To the left is a press cylinder being machined on a 72″ Draw-shaper and to the right is a large platen on a 14′ wide Planer. Here we custom-produce a wide variety of machinery or machine components to do difficult jobs in petroleum, chemicals, atomic power—in many fields.

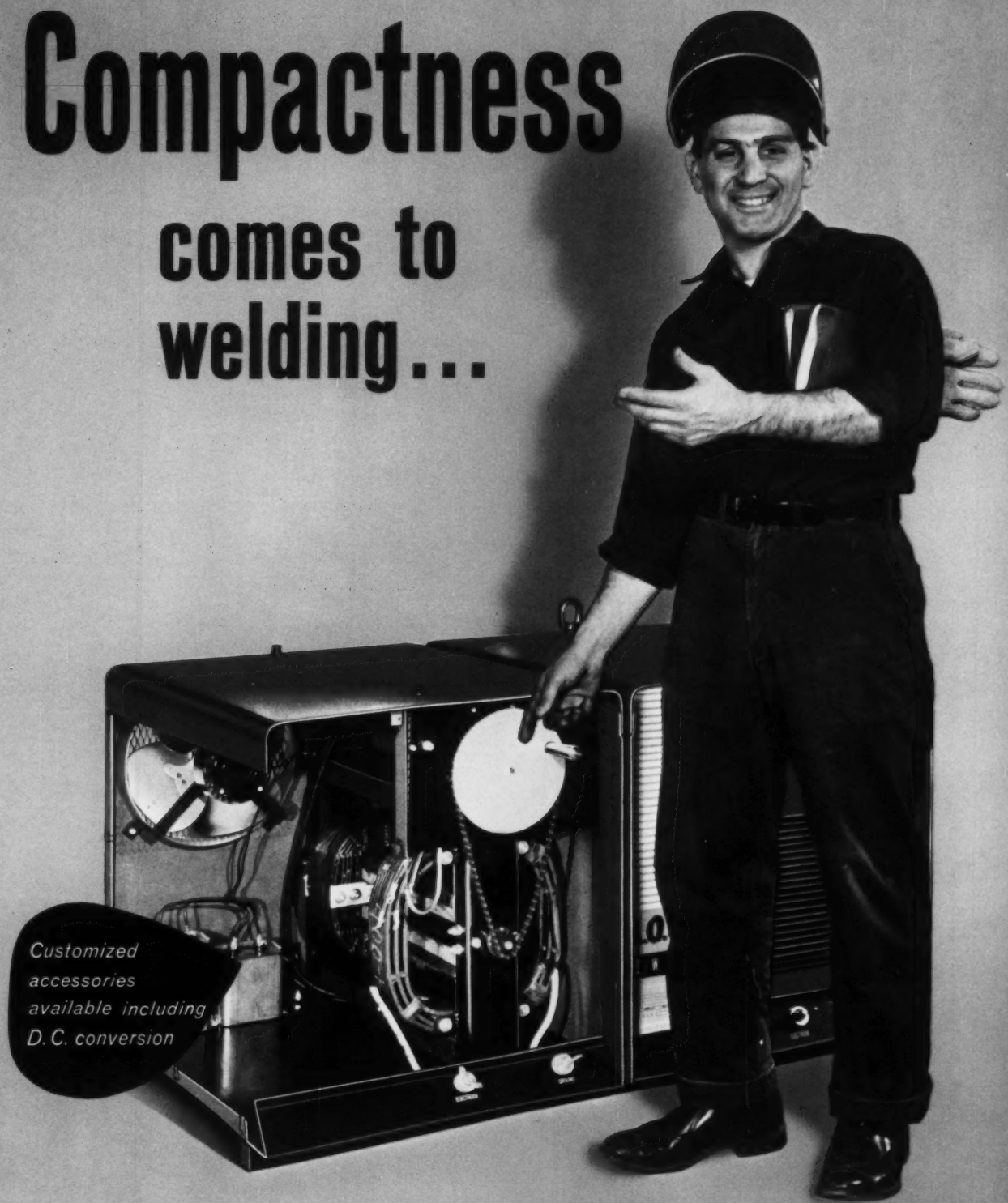
If you would like to investigate the advantages of Sun Ship machine building service, why not contact our Sales Engineering Department now? For information and data on any phase of our service, simply write

Sun

SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE • SINCE 1916 • CHESTER, PA.

Compactness comes to welding...



Customized accessories available including D.C. conversion

A. O. Smith's new MONARC line trims the waste from welding machines

No waste of space!

No waste of space!

It stacks! It racks! It slides under a bench with the greatest of ease. Only 28 inches low . . . 24 inches wide . . . 30 inches deep—the **MonArc** fits where others take up valuable floor space. You release area for increased production — an important factor with industrial space cost averaging $10 a square foot. We achieved this compact design without compromising superior welding characteristics of the moving-coil machine by making coil movement lateral.

No waste of motion!

We made time and motion studies. We learned how to achieve compactness with no sacrifice in operational ease. For example, while the **MonArc** is a *foot lower* than conventional machines, the full-range, stepless current-control wheel is at convenient arm's length—higher than competitive models. We also cut down handwheel turns to 15 — fewer turns and easier turning than with any other standard characteristic welder in the market.

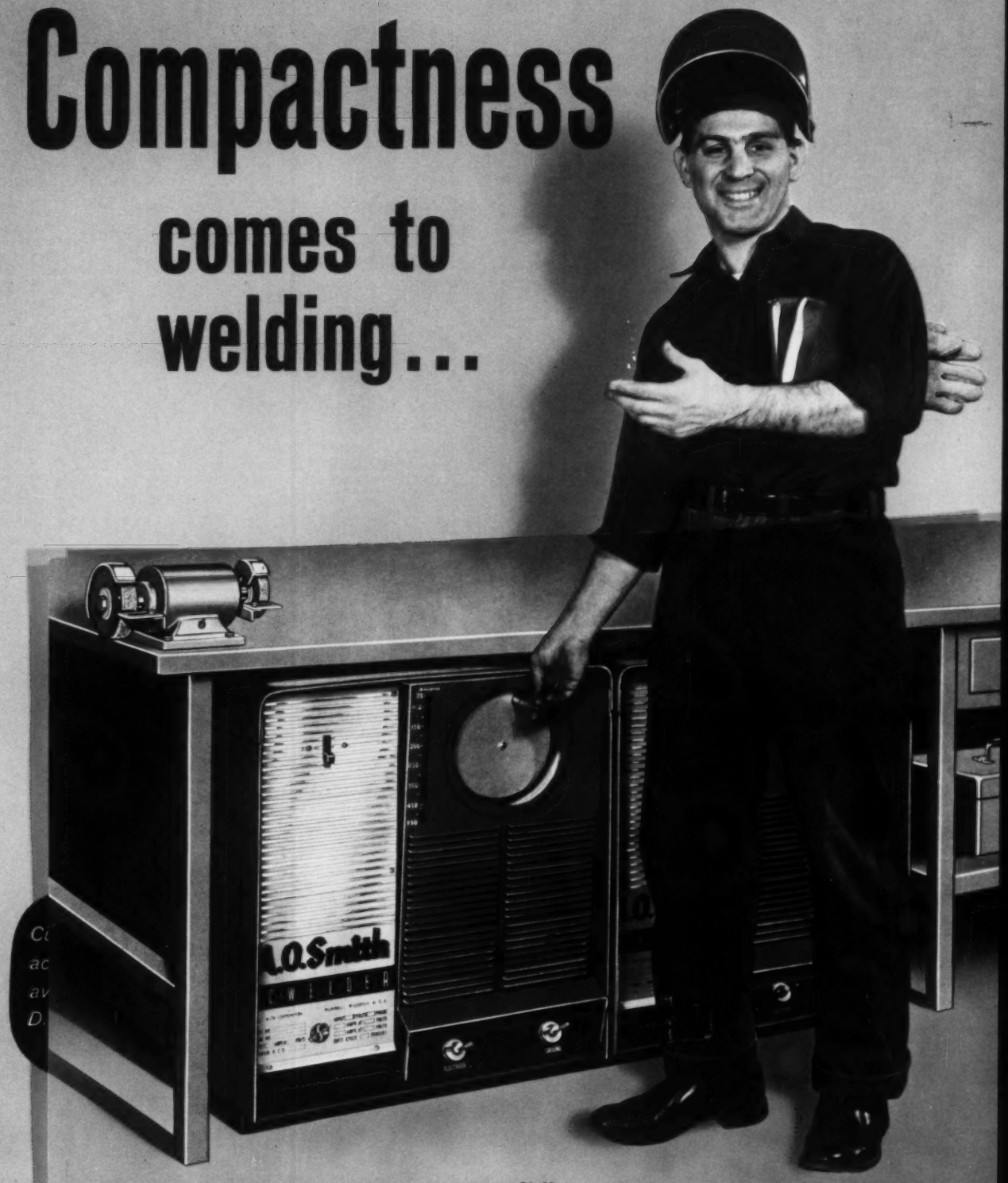
No waste of money!

Superior in design. At an economical price, no other machine gives you so much for your money. But while you get more, you never get more than you want. The **MonArc** line consists of three basic machines (300, 400, 500 amp models). We customize this basic line with a selection of tailored accessories. You check off exactly what you need — no built-in "excessories" that add only cost to your operation.

No waste of time!

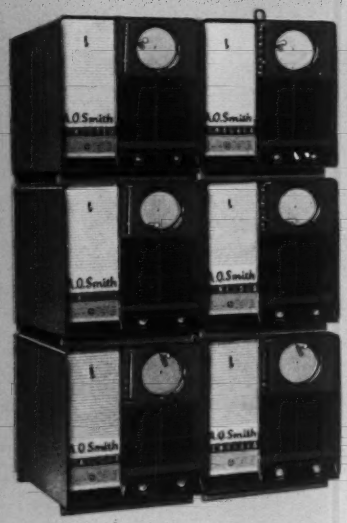
Our customized approach also saves on delivery time. You don't have to wait two or three weeks for delivery of a certain model from our home factory. Basic machines and customized accessories are stocked in warehouse centers and distributor houses enabling us to meet your requirements exactly . . . and meet them quickly.

Compactness comes to welding...

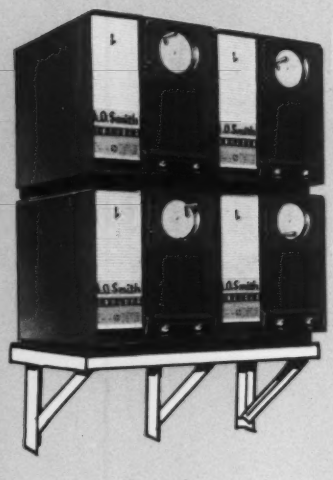


A. O. Smith's new MONARC line compacks more machine in a smaller package at a smaller price

400 AMP model shown—all models same size.

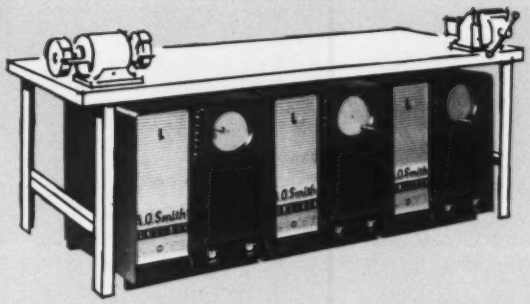


It stacks up to three high!



It racks!

It slides under a bench!



SEE HOW IT STACKS UP! The new **MonArc** line is on display at A. O. Smith welding equipment distributors everywhere.

SPECIFICATIONS

Series No.	Rated amperes at 40 volts	Input kw	Duty cycle	Primary amperes with PF correction		Primary amperes without PF correction		Power Factor*		Open-circuit volts	Welding range	Weight in pounds	Height	Width	Length
				230 volts	460 volts	230 volts	460 volts	without capacitor	with capacitor						
300 L	300	12	60%	100	50	108	54	65.4%	79%	80	60-430	363	28″	24″	30″
400 L	400	16	60%	124	62	140	70	65%	84.5%	80	75-550	400	28″	24″	30″
500 L	500	20	60%	158	79	174	87	66.7%	84.2%	80	90-670	415	28″	24″	30″

*Power factor is the average value which includes the benefits of the power factor capacitors when not welding (based on 60% duty cycle).

Because welding fabrication is our full-time business, A. O. Smith maintains the industry's most comprehensive research and development facilities. That's why we can offer you America's finest machines, accessories and electrodes. And when you call your man from A. O. Smith, you'll find that he's more than just a salesman. He's a welding specialist fully qualified to help with your welding problems.

Through research . . . a better way

A.O.Smith
CORPORATION
WELDING PRODUCTS DIVISION
Milwaukee 1, Wisconsin
A.O.Smith INTERNATIONAL S.A., Milwaukee 1, Wis., U.S.A.

MW-263

LITHO IN U.S.A.

SIMONDS ALL-NEW SUPER HIGH SPEED STEEL METAL BAND SAW

This ALL-NEW SUPER HIGH SPEED STEEL Band Saw Blade

comes welded-to-length . . . ready to use . . . in striking, new package with cutting edges protected by a special plastic cover.

PERFORMANCE GUARANTEED!
up to 3 times better than ordinary blades

The biggest advance ever in metal cutting band saw blades — that's Simonds *SUPER* High Speed Steel Metal Band Saw. No matter what ferrous metal you're band sawing, this brand new blade will give you *up to 3 times better performance* than any High Speed Steel blade you're now using!

This is not just a claim but a provable fact backed by Simonds' established reputation as a leading manufacturer of industrial cutting tools.

This *SUPER* High Speed Steel Band is an entirely new concept in band saws . . . new steel*, new manufacturing methods, new heat treatment, new welding techniques, new final inspection.

Laboratory and field tests demonstrate that this new saw is so much better in every way for production cut-off work that we are offering it on a PERFORMANCE GUARANTEED basis! You can't lose — you can cut your blade costs, save on down time, get the equivalent of up to 3 saws in better performance *at a cost of only 10% more than ordinary High Speed Steel blades.*

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*Developed and made in Simonds own Steel Mill — Patent Applied For

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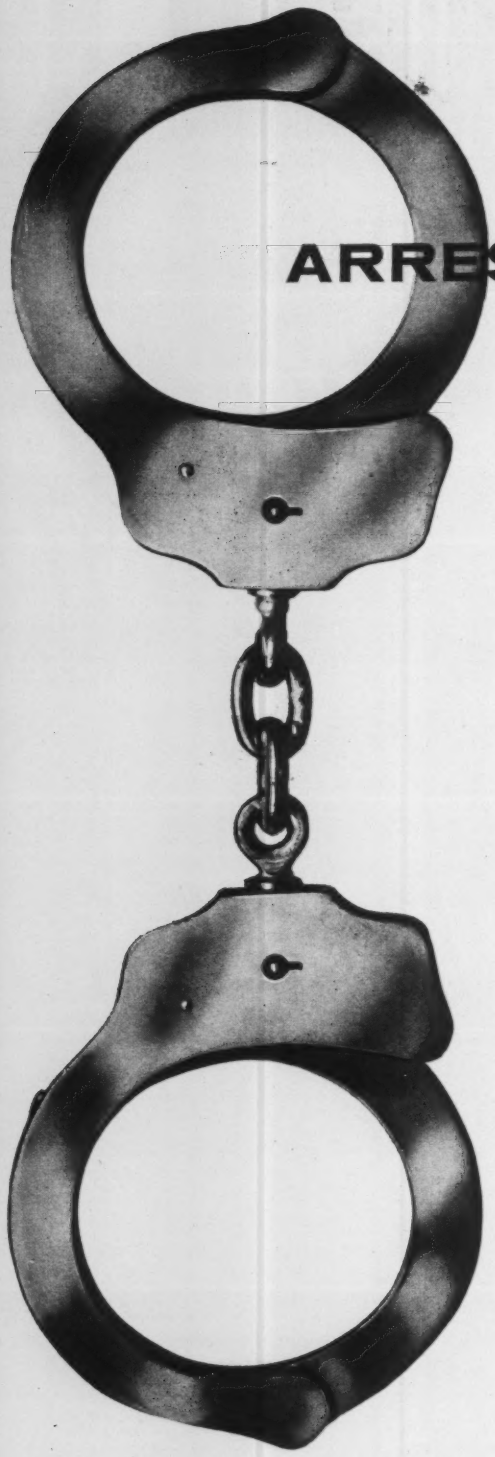

ARRESTING NEWS FOR THE FASTENER TRADE

. . . and all others who require quality bars and rods!

Though our name is new, Seaway Steel personnel are thoroughly familiar with the needs of the Fastener and Forging trades . . . and this experience extends from front office right straight through our plant and rolling mill.

Less than a year ago, the same men who now produce steel at Seaway, were rolling bars and rods for fellow workmen who stood by at cold headers just a few yards away, producing fasteners for Buffalo Bolt Company.

The broad fastener experience of our staff is at your disposal.

Bars and Rods of any size or shape produced to your specifications, regardless of quantity.

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SPECIAL HEAT TREATING • SPECIAL HARDNESS

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SEAWAY STEEL CORPORATION

101 EAST AVENUE • NORTH TONAWANDA, NEW YORK

OUTLOOK IS GOOD FOR HIGHER CAPITAL SPENDING in metalworking. Latest survey of capital appropriations, conducted for The IRON AGE by the National Industrial Conference Board, shows first quarter trend is up. Most metalworking industries posted average gains of 12 pct over year-earlier levels. Biggest gains were made in appropriations of non-electrical machinery, transportation equipment, and electrical machinery industries. The exception is the steel industry where spending plans are 10 pct less than fourth quarter '59 and 25 pct below the levels of first quarter '59. P. 73.

U. S. FOREIGN TRADE PICTURE IMPROVES. The first quarter 1960 balance of international payments shows a reduction in the excess of payments over receipts to seasonally adjusted annual rate of about $3 billion. Commerce Dept. credits the improved showing to expansion of business activity in other industrialized countries. This is contributing to demand for U. S. exports, particularly industrial materials and capital goods.

STATES TO GET INCREASED U. S. HIGHWAY FUNDS in fiscal 1961. The Commerce Dept. announced that $2.873 billion will be available to the states. This total exceeds the $2.7 billion available for 1960 and compares favorably with former years.

SALES OF METAL-FABRICATED NUCLEAR REACTOR COMPONENTS and equipment are estimated to have reached $101.9 million (non-military) in 1958, according to the Atomic Industrial Forum. Some major sales items: Reactor vessels and tanks, steam generators, condensers, and heat exchangers.

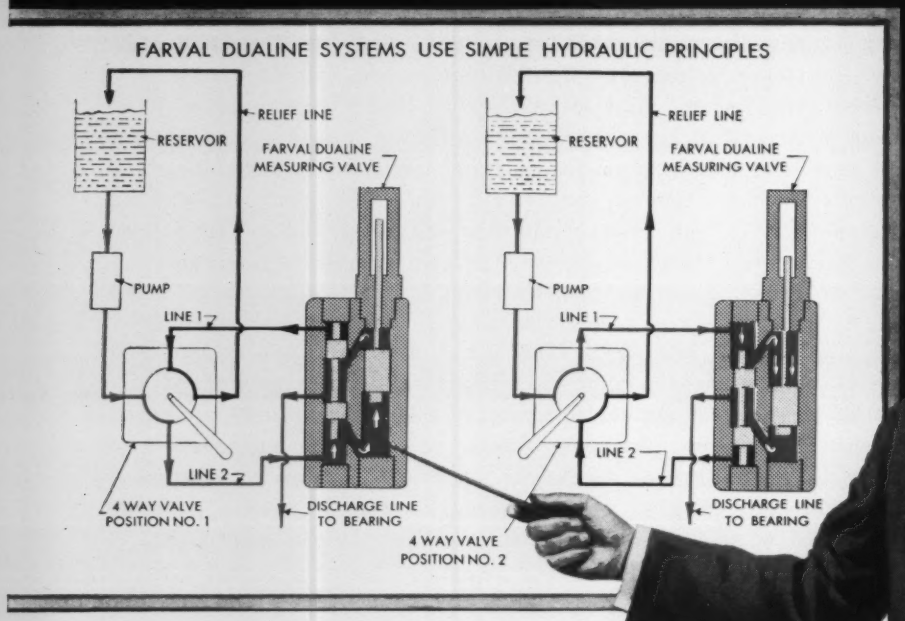
RETAIL SALES SHOW SOME STRENGTH. The total dollar volume of retail trade in the first week of June was 4 pct higher than a year ago, according to Dun & Bradstreet. Purchases of air conditioners and dishwashers rose from last year and auto sales remained well over the similar week in 1959.

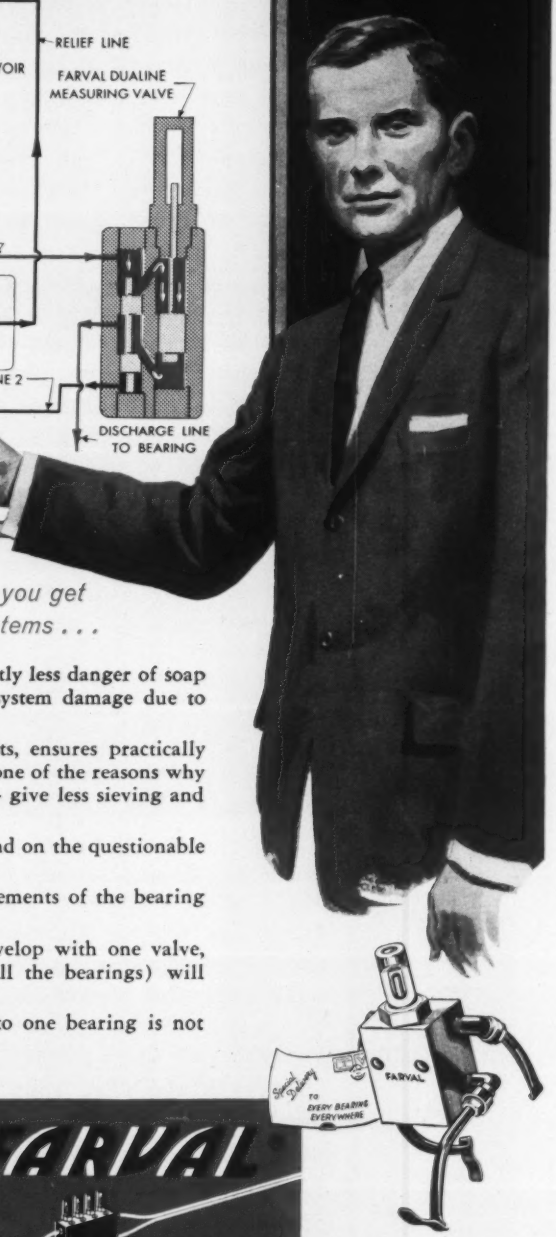
PHILIPPINE MARKET HAS GOOD POTENTIAL, according to a U.S. trade mission just returned from that country. "There is a great and growing need for industrial machinery and equipment," says the mission. Prospects for Philippine agricultural diversification also offer opportunities for sales of U. S. agricultural equipment.

CONSUMER SHORT AND INTERMEDIATE CREDIT JUMPED by more than $1 billion in April over March. April credit amounted to $52,169,000,000.

FARVAL
—Studies in Centralized Lubrication
No. 246

"For positive lubrication of large, medium and heavy-duty installations . . . it's a Farval Dualine System!"





With Farval Dualine centralized lubricating systems you get the following distinct advantages over other type systems . . .

(a) Much lower operating pressures with consequently less danger of soap separation on grease systems. Also, less danger of system damage due to high lubricant pressures.

(b) Large lubricant passages with no pinhole ports, ensures practically full pump pressure for every metering valve. This is one of the reasons why Farval Dualine systems operate on lower pressures — give less sieving and working of lubricants.

(c) Positive indication at each bearing — does not have to depend on the questionable action of a single indicator at the pump.

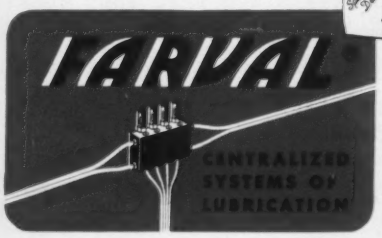
(d) Each metering valve individually adjustable for the requirements of the bearing it serves.

(e) Independent metering valve operation. Should trouble develop with one valve, the system will continue to operate. Only one bearing (not all the bearings) will require hand lubrication until trouble is corrected.

(f) True lubricant metering. Quantity of lubricant delivered to one bearing is not dependent on any other valve in the system.

(g) Much easier to spot and correct trouble.

Check with your Farval Representative and see how these versatile systems can improve production operations — reduce costs. Or write for free Bulletin 26-T containing complete engineering information on Farval Dualine systems.



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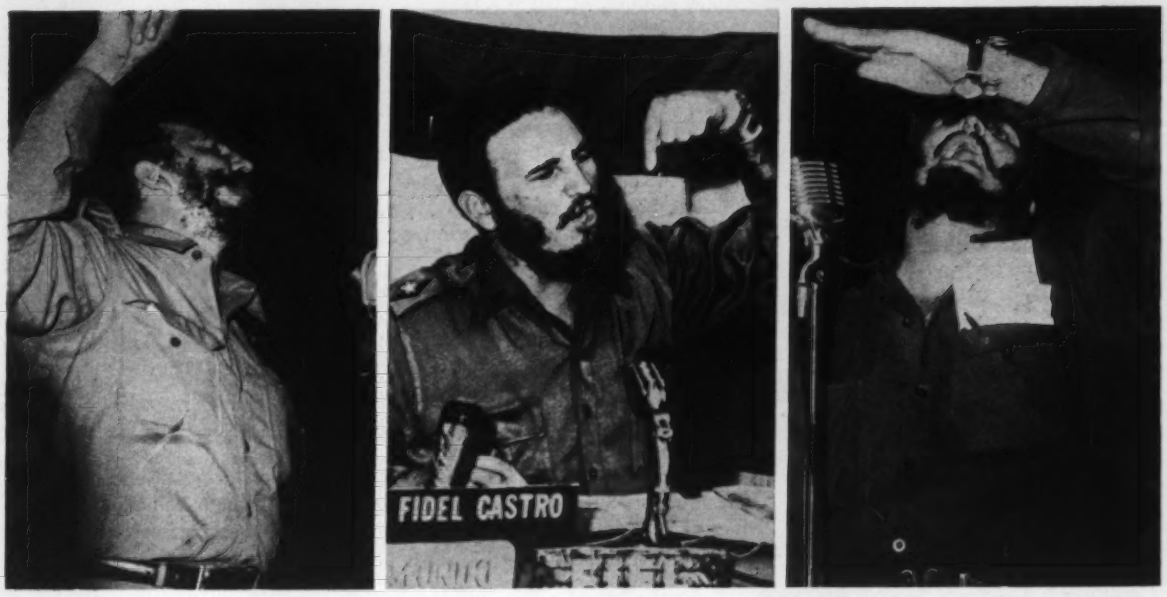


FIDEL'S MANY FACES: Castro's emotionalism may provide the basis of spreading unrest in Latin America.

U. S. Companies in Cuba: How Long Can They Hold Out?

U. S. companies with interests in Cuba can do little more than take a firm stand and hope for the best.

"Hate U. S." feelings throughout South America thrive on Castro's continuing tirades. — By Tom Campbell.

■ Cuban Premier Fidel Castro's earlier motives may have been lily-white. Today they are questionable —to Americans.

Just why Castro is making Mr. Khrushchev a poor second in anti-American invective is hard to tell. But his emotional attacks on the United States will probably get far worse before they subside—if they ever do.

Another Paranoid—Part of Fidel Castro's paranoid-like stance probably has something to do with his painful emergence from the never-never-land of cops and robbers into stark reality. It seems that his screams are in direct proportion to his responsibilities or his frustrations in trying to make over a nation that often had forgotten its masses.

Regardless of whether or not Castro is a dictator (who derives his power from the masses), he has set off an anti-American feeling in Cuba unmatched in the past. And there is every sign that conditions will not change.

A Shocker—Even North American companies used to some Latin American movements are aghast at events in Cuba. The strong stand taken by two American and one British oil company indicates the seriousness of the outlook. To face expropriation rather than refine Russian oil—and thus endanger relations with oil-important Venezuela —is an unusual stand.

Communication and utility firms have or will have similar problems if the takeover of American-owned or American-run hotels is to be a pattern. When the hotels were taken over, it was as if the management was thrown out because it was responsible for the collapse in the tourist trade.

Extreme Left Wing—This is no ordinary revolution in Cuba. Because it is far to the left, there is bound to be trouble for foreign businesses in Cuba. Nothing short of absolute kow-towing to Castro and his crowd will do. Even then, the end might just as well be seizure if

present tactics are any criterion.

Whether or not the Reds have taken in Castro or whether he has taken them in—is beside the point. The Reds thrive on situations like those abounding in Cuba. The inner clique behind Fidel Castro who do his bidding (or control him) is far from a harmless Latin revolutionary group. It includes hard core Red trained hatchet men. (See page 7.)

The "dramatic" missions that Fidel has sent to Russia and other countries are powerful propaganda machines. And they mean more trouble for the United States.

The Fever Spreads—More serious is the awkward position in which Castro has put other Latin American nations in their relations with North Americans. Most serious and sincere Latin Americans deplore most of Castro's hate tactics. But the masses, as yet, look upon Fidel as a hero and a saviour of the people.

Efforts of Castro and his forces to spread the Cuban revolution fever to other Latin American nations is bad news for American business and also for Latin American countries. (It is hard for one Latin nation to deplore publicly what another Latin country is doing.)

Time for Decision—In view of the position of the United States in the world situation, it is probably better for Mexico and Central and South American governments to fend off the bad effects of the Castro gyrations and looseness with the truth. Even more serious are his probable plans to exploit and use American firms and businesses as he deems proper, for his own purposes.

The long-term picture of nickel from Cuba looked favorable until the squabble took place with Castro. Now, millions of dollars of steel industry and automotive money has been sterilized for the time being. The Freeport Sulphur project to extract nickel from the laterite ores of Cuba is at a standstill.

A Look Ahead—The future of foreign oil firms in Cuba is fraught with risk and fiscal danger. Problems faced by American and other foreign firms in Cuba are most unusual because of the infiltration of the Communists. This is spurred on by the white-hot hatred Castro appears to reserve for the U. S.

Some American industrialists familiar with the Cuban situation feel that eventually another revolution will unseat Castro. Yet they strongly doubt this is anywhere near. Castro took over the country in the usual Latin American manner. He was a hero who was against a corrupt dictator. The dictator was overthrown, but a new dictator stepped in. Now Fidel must do or try to do what the people expect of him.

Counter Movements—So far, the counter movements against Castro are not large. They do not have support from the majority of the people. If they did, he would be out on his ear.

Whether they can unite and leave their own squabbles behind them remains to be seen. Even if the movement becomes strong, Castro will probably remain in power as long as the people feel he is for them.

It Spreads—It is this feeling of frustration that bothers some American firms with interests elsewhere in South America. It bothers other Latin nations who feel that Castro, with his Communistic connections and dealings, means trouble in their countries.

Responsible South American experts tell The IRON AGE they do not believe Castro's American hate complex will find fertile ground in other Latin nations. What they probably mean is that it won't have any lasting effect on North and South American relations. This may be too optimistic a viewpoint.

Deals With Russia—Barter deals with Russia, probability of formal relations with Red China, a steel plant commission from Russia, and everything that Mr. K and Co. can cook up are in the picture.

The best that industries can hope for is that they will not have their assets and business taken over. They hope, too, that there will be no complete breakdown in Cuban-United States relations beyond Castro's name calling. But that is poor solace for those who have millions tied up in Cuba and had big plans for expansions and better relations.

Grim Outlook in Castro's Cuba

American companies in Cuba are in for a rough time. It'll be rougher, by far, than any they have seen. There is little they can do about it. The "revolution" stays on as long as Castro has the power to rule. He may have it for some time.

Here's what can happen:

Castro's anti-American program is in full swing. It will continue. U. S. interests will feel the brunt.

Giving in to Castro means nothing. It is heads-you-lose, tails-he-wins. Even though a strong stand looks hopeless, a weak-kneed stand is more hopeless.

U. S. companies are the front line. They can't afford to endanger their other Latin American relations by poor judgments in Cuba. They must stand up to Castro with facts and courage even though he will lie out of any corner he gets into.

Close cooperation with the U. S. government is a necessity. And this goes for companies from other friendly nations.

Keep your fingers crossed and remember that for more than 60 years it has always been a risk to do business in Latin America. But it has been worth it and will be again.

GOING ASHORE: Many of these Great Lakes seamen, who went back to work only a scant two months ago, are now idled. Low steel operations caused the unprecedented early cutbacks in ore shipments.

Sales Chill Cuts Ore Hauling

Some ore boats on the Great Lakes are calling it a season after about two months of operation.

Cutbacks in ore shipments reflect sharp downturn in steel sales.—By T. M. Rohan.

■ The slowdown in steel production has backed up the industry all the way to the Great Lakes ore fleet.

The largest fleet on the Lakes, Pittsburgh Steamship Div. of U. S. Steel, announced it is tying up 13 of its older and smaller ore boats for the season after barely two months' operation. Forty will continue to operate.

More Moves Expected—As a result of the Pittsburgh Steamship move, other operators are re-appraising schedules and order books. More cutbacks will probably be announced.

Boats in operation as of May 15 this year numbered 217 out of a total fleet of 235 or 94.8 pct of the tonnage capacity. The new cut drops this only to about 89 pct since newer boats are much larger.

The cutback by Pittsburgh Steamship will remove over 900,000 tons per month of capacity or over 3.5 million tons by the end of the normal season in about mid-October. Total trip capacity of the Pittsburgh Steamship fleet is 764,100 tons.

About 450 men and officers will be laid off, about 35 per boat. Most will probably collect Supplementary Unemployment Benefits since they are CIO Steelworkers.

Sharp Reversal—The cutback is a reversal of earlier hopes of a big year on the Lakes as the fleet worked to make up tonnage lost last year when the strike wiped out better than half the season. Only a warm December enabled shippers to pile up enough ore until spring. The season's last load cleared Two Harbors, Minn., Dec. 20th for a new all-time record late season.

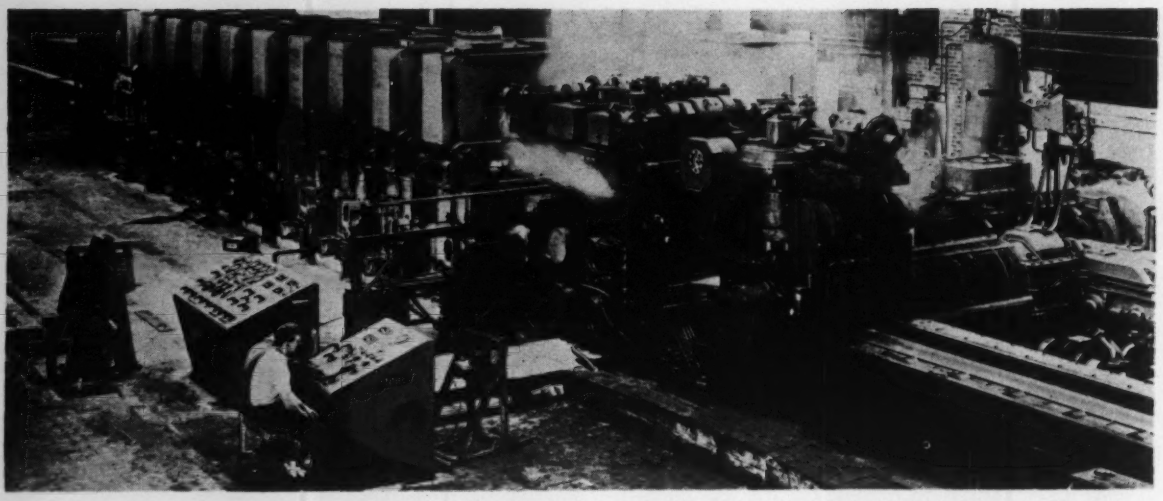
The cutback by Pittsburgh Steamship is the earliest since the 1954 season when some boats were laid up in July and August as steel demand dropped. Great Lakes tonnage that year dropped to 60.7 million tons compared to 95.8 million the year before.

Reflects Steel Market — This year's cutback is a reflection of a complete and largely unexpected reversal of the steel market. Steelmaking is now dropping below 60 pct of the industry's capacity. And districts depending on Great Lakes ore are among the hardest hit including Youngstown, Buffalo, Pittsburgh, Chicago, and Cincinnati.

The low operating rate plus heavy hauling so far this season have combined to bring on a mild glut of ore on lower Lakes docks. As of April this year, only 203 out of 258 blast furnaces in the U. S. were in operation. More have been shut down since April.

Total ore inventory on receiving docks in the U. S. and Canada as of April was about equal with last year when large tonnages were left over from the 1958 recession. Stocks on hand then were 34.1 million and this year were 33.8 million. Stockpiles of foreign ore (except Canadian) were greater this year at 13.5 million tons against 9.3 million in April a year ago.

Great Lakes boats were out early this year, hauling in April almost twice the tonnage they did last year.



ONE OF FOUR: This Sendzimir planetary hot-rolling mill, in operation at J. J. Habershons & Sons, Ltd., of Rothersham, Yorks, England, is the second of only four such installations in the world.

British Steelmakers Look Ahead

Leading executives say the industry plans to boost steel-making capacity by 30 pct within the next 5 years.

But the industry doesn't expect to increase exports of steel to the U. S.—By F. J. Starin.

■ In sharp contrast with faltering steel operations in the U. S., British steelmakers expect 1960 to be a record year for their industry.

Mills are currently operating at capacity and will likely run full tilt through the year. Output is expected to be up 20 pct over last year and more than 10 pct better than the record 24 million tons made in 1957.

Leading British steelmakers, in the U. S. for the British Exhibition at New York, told The IRON AGE what they see ahead for their industry. The delegation included Richard Summers, president of the British Iron and Steel Federation, and chairman of John Summers & Sons, Ltd., a steel producer; Sir Ronald Morrison, independent chairman of BISF; and Edward Senior, BIFS commercial director.

What's Ahead—British steelmaking capacity will be boosted by about 30 pct within the next five years, to over 33 million tons from a current 25 million tons. To get the program moving the steel companies will spend about $370 million this year and "substantially more in 1961."

A major part of the expansion program will be the addition of two wide sheet mills and expansion of one of the three now operating.

Wide sheets are now the shortest item on the British steel market. Much of this deficit is imported from the U. S. At the current rate over 100,000 tons of sheets from 36 in. to 80 in. wide will be shipped from U. S. mills to England in 1960. Other steel products will account for 200,000 more tons of steel that Britain will buy in the U. S. this year.

Indirect Steel Exports—The British expansion could cut deeply into this market for U. S. sheet. In fact one steel man says, "I'll eat my hat if we aren't self sufficient in wide sheet in two to three years."

However, British automakers are the biggest users of wide sheet. And their programs for increasing capacity over the next five years are called "fantastic" by another steelmaker. But there is no doubt that a primary aim of the program is to make Britain self sufficient in all steel products.

There will be no real increase in the tonnage of British steel exported to the U. S. However, British industry and government agree it is preferable to export products made of steel rather than primary or mill shapes. So British steelmakers expect more of their output to find its way to the U. S. as consumer durables or machinery.

Six and Seven—British Iron and Steel Federation leaders favor eventual merging of the Inner Six, or Common Market, with the Outer Seven, or European Free Trade Association, of which Britain is a member.

There are some serious problems. One is the current system of Commonwealth preference. England and her Commonwealth nations favor one another on tariffs.

Industry Still Wants A-Power

Business Spends to Build New Reactors

Far from lagging, industrial interest in nuclear power and isotopes is growing.

Metals industry among those closely watching developments. —By K. W. Bennett.

■ There are under development or construction an estimated $1 billion worth of nuclear reactors in the U. S. This figure includes both industrial and government outlays.

At the same time, the brand new isotope industry, an offshoot of nuclear development, grew 16 pct in 1959. At least 150 firms now process and sell isotopes for industry.

Plans Underway—A recent spatter of negative reports on the cost of atomic power hinted fewer atomic reactors will go up in the future, as other new power sources are developed.

But atom power seems to be headed up, not down. An estimate suggests there are over 350 reactors in operation or being built in the U. S. The U. S. has only two privately built reactors generating commercial electric power.

But at least six are under construction, and 10 more are planned. If the plans are being shelved, there is little indication of it. Recently Pacific Gas & Electric began discussing a major atomic power plant. Southern California Edison recently announced a letter of intent for a giant 300,000 kw atomic plant.

Big Business—Reactors are big business. Next week, the Dresden reactor at Chicago will hit full 180,000 kw output for the first time. This big plant, though smaller than the projected California plant, represents a total $51 million outlay. General Electric constructed the Dresden plant at a flat contract charge of $45 million.

All of these represent outlays by U. S. business. Meanwhile, the Atomic Energy Commission will boost its outlays for reactor development from $347 million in 1959 to $390 million in 1960. It's a long way off, but 1961 outlays by AEC may hit $436.2 million.

The AEC personnel are good people to know. Total research outlays by this agency, including atomics, will reach over the $1 billion mark in 1959 and 1960.

STRETCH Ready — Far from slowing down, atom research appears to be speeding up. Within weeks, the giant "STRETCH" computer will swing into action. It will work on atomic reactor problems at a 100 billion computation per day rate. That's 1 million computations per second. Russia may be graduating more scientists, but it would take 170 million of them to equal the think power of this machine. "STRETCH" marks a major speedup in the success of the entire U. S. atomic program.

Metal Applications — Development of high temperature reactors will open new fields to atom reactors. Several steel companies have been watching nuclear reactors for at least two years. Their hope: That reactor temperatures can be pushed high enough for ore beneficiation or even melting of some steels in the future.

CONTROLS FOR NO. 5: Member of staff of Argonne National Laboratory instructs operator about control console of Chicago Pile No. 5, principal research reactor at Argonne, near Chicago. Lab is a major U. S. center for research into the peaceful uses of atomic energy.

Canmaking: Tinplate Battles Aluminum

Competition from aluminum cans pushed development of new thin tinplate.

Change in prices for light gage tinplate are part of the pattern.

■ Tinplate's battle with aluminum for the light can market is rapidly reaching the boiling point.

The latest move came June 9 when United States Steel Corp. reduced net prices for its light gages of tinplate. U. S. Steel explains the slash by saying:

1. It is acting to meet competitive materials.

2. It anticipates successful development of the new thin tinplate.

Surprise Move—The second part of this statement indicates some of the urgency that has come into steel's push to beat back the threat of the aluminum can. It was expected the new method of rolling tinplate would ultimately bring savings. It is a little surprising, however, that prices should be reduced before the start of production.

Informally, tinplate men are now saying thin tinplate is a must for the immediate future, not just a promising development.

Citrus Battleground — Directly behind this thinking is the progress aluminum has been making in citrus can applications. Oil and other containers are getting attention from aluminum producers. But the juice can seems to be hottest area of contention.

A short time ago, Reynolds Metals Co. revealed it was using portable equipment to make and fill juice cans right at the concentrating plant.

At the time, the project was described as experimental. However, trade sources say Reynolds is plunging ahead with its program. The company has reportedly ordered five canmaking lines.

Changes Explained—In countering the aluminum offensive, U. S. Steel has made two kinds of price changes. The old price schedules offered relatively narrow differentials when thickness dropped below 75 lb. The new schedule widens the spread and offers a greater saving from the use of thin gages.

In the old schedules, prices in the thinner gages increased sharply as widths were increased. The differential reflected the problems of rolling thin tinplate in wide widths. Since canmakers are geared to wide widths, the extra charges discouraged use of thin gages.

In the new schedules, added groupings give a more gradual increase in charges as widths increase.

Reaction Sure—How aluminum men will react to the new prices remains to be seen. But it is certain there will be more developments.

Computer Will Speed Space Program

■ Scientists will check the performance of the 1.5 million-lb-thrust Saturn space vehicle while it's on the ground.

Making this possible is the new IBM 7090 data processing system, the most powerful to be used in the U. S. space program. It can add 13.74 million numbers a minute. The system has been installed at the National Aeronautics and Space Administration's Marshall Space Flight Center, Huntsville, Ala.

Before the Saturn is launched from the ground next year, it will be "flown" mathematically thousands of times. Each flight will cost several hundred dollars instead of millions of dollars for actual launchings. They'll only take minutes.

Here Dr. Werner von Braun (right), director of the Center, reviews solar-system flight calculations with Dr. Helmut Hoelzer (left), Computation Div. director; and Dr. Eberhard Rees, deputy director for research and development at the Center.

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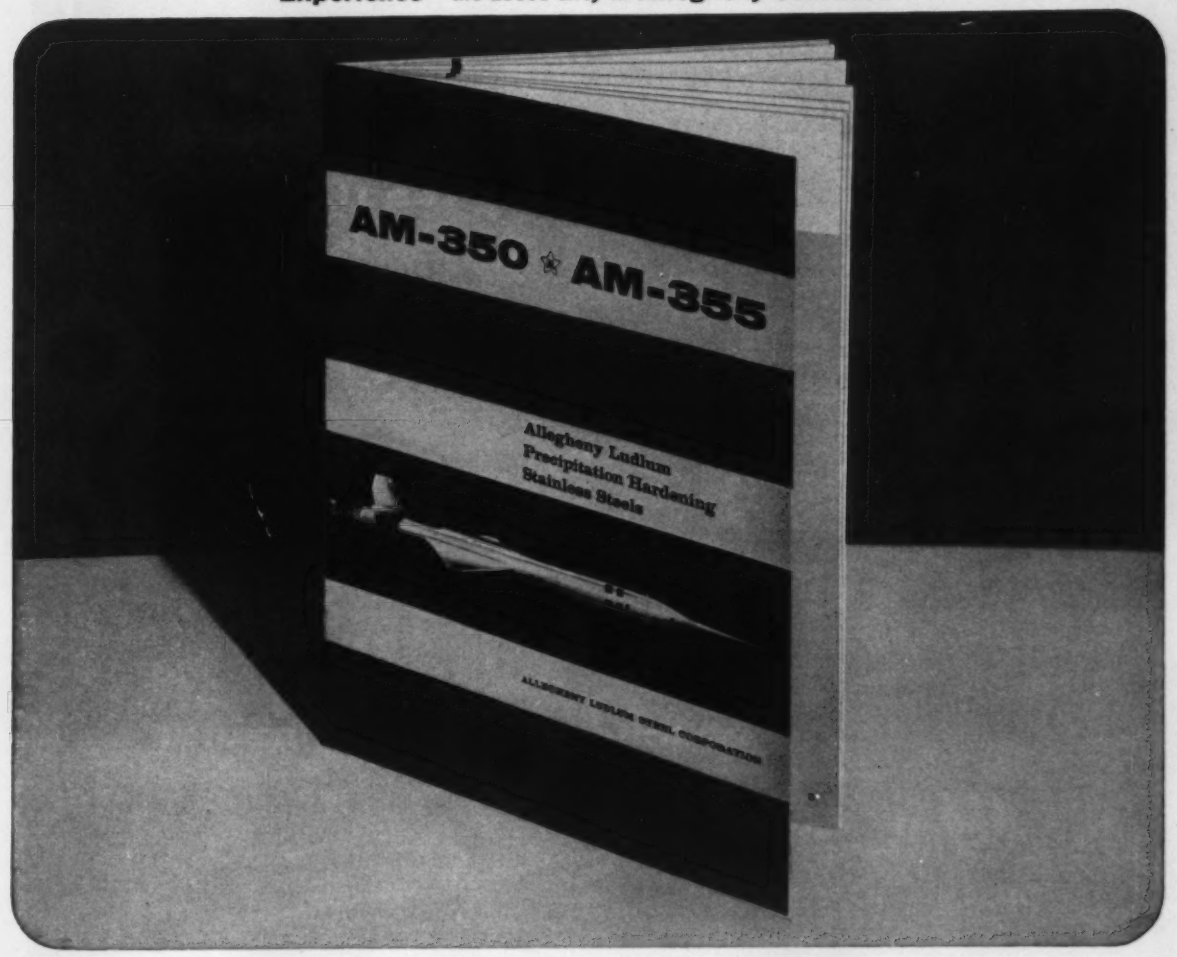

New booklet on A-L's precipitation-hardening stainless steels, AM-350 and AM-355

A tool for anyone interested in high strength-to-weight metals

In this technical booklet, you get the facts on Allegheny Ludlum's precipitation hardening stainless steels, AM-350 and AM-355, metals developed for space age requirements.

AM-350 and AM-355 combine these unusual qualities. They are easy to fabricate. Have high strength-to-weight ratios at room and elevated temperatures combined with excellent resistance to corrosion.

The physical and mechanical properties of the two metals are described in 33 charts and tables. Included are heat-treatment and fabrication data, eight photomicrographs and a section on corrosion resistance with representative values in selected environments.

It's jam-packed with data. For your free copy, see your A-L representative or write *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. IA-6-4.*

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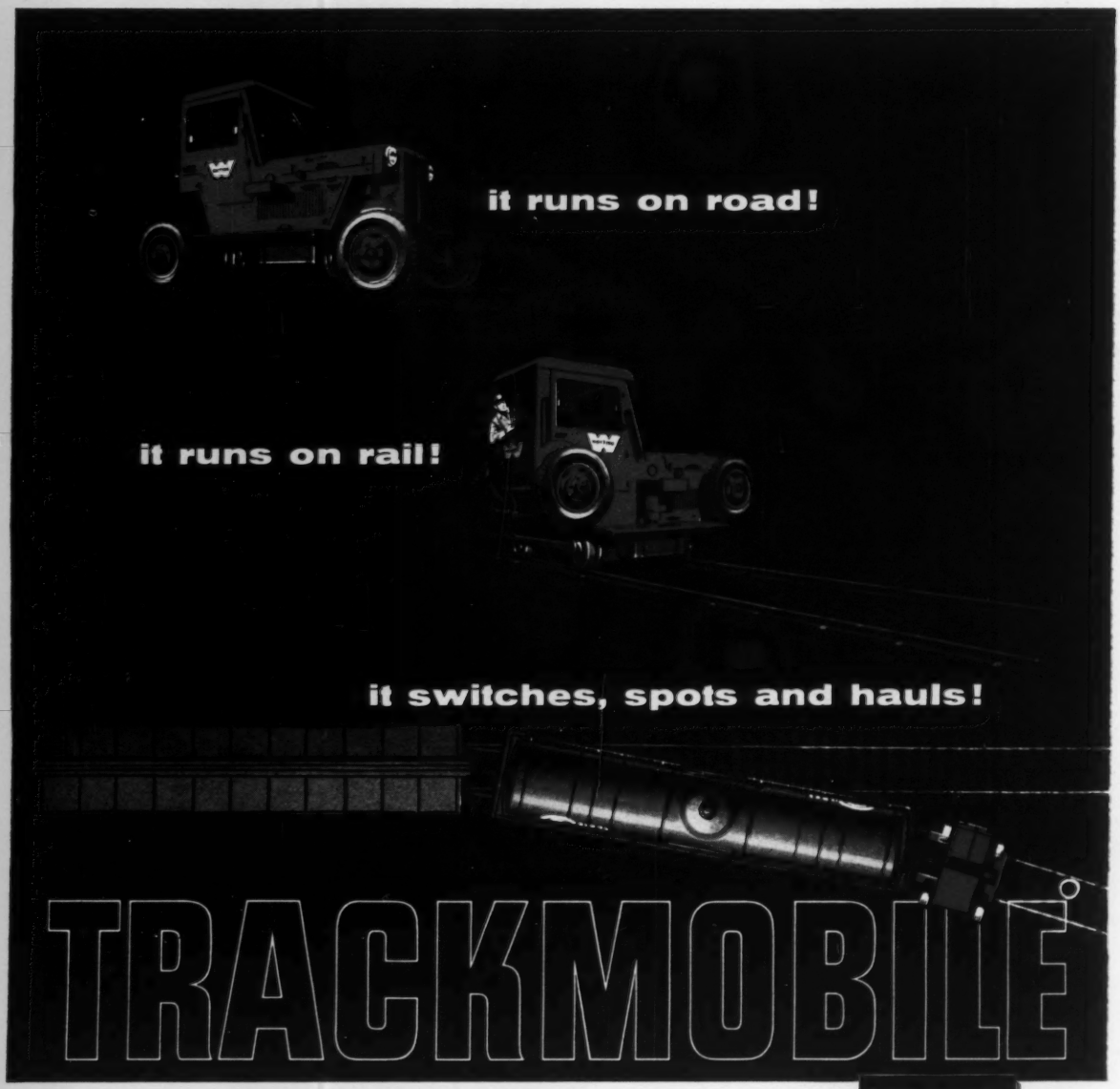

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Dr. Guilliam H. Clamer

His Is a Long, Active Career

Dr. G. H. Clamer has been in the metalworking industry for more than 60 years.

But although he's 85, he still remains active and his knowledge is highly useful to his much younger associates.

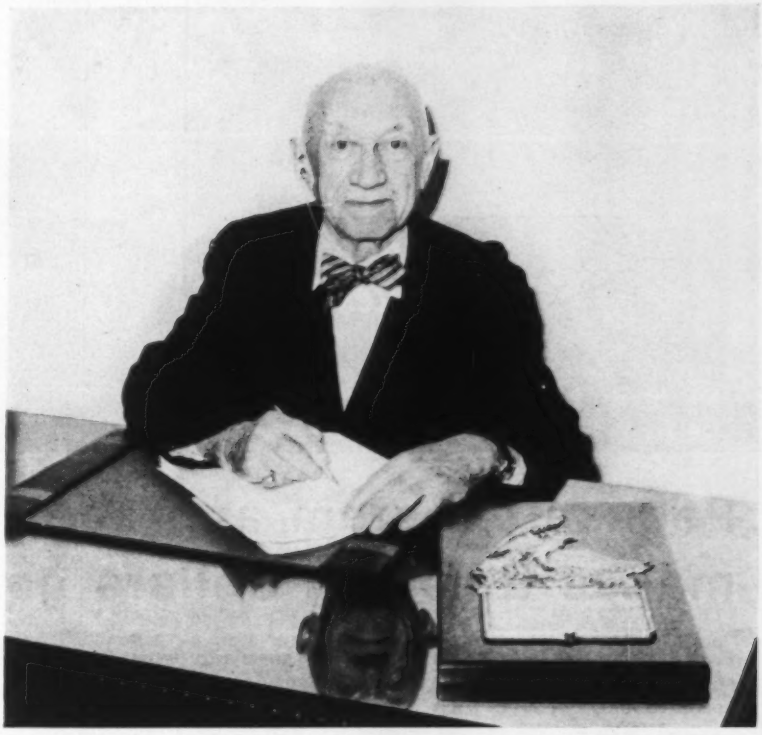
■ The age 65 means retirement for many men. But Dr. Guilliam H. Clamer isn't a member of this group. At 85, Dr. Clamer is still active in metalworking, the field in which he began his long career.

Dr. Clamer, a Philadelphian, was born in 1875. In 1897 he received his baccalaurate degree in chemistry from the University of Pennsylvania. And in the same year he established what is believed to be the first chemical laboratory in the nonferrous industry at Ajax Metals Co., Philadelphia, now a division of H. Kramer & Co.

A Pioneer—Dr. Clamer did a great deal of pioneer work in the chemical phases of the nonferrous industry, and in the possibilities of the electric melting of nonferrous metals. He has to his credit many inventions, including a refining process employing scrap metals. For this, he received in 1901 the Elliott Cresson Gold Metal, the highest award presented by the Franklin Institute at the time.

In 1910, when a new type of furnace was needed by the industry, Dr. Clamer set out to develop one. By 1916 the "Ajax-Wyatt" low frequency or submerged resistor induction was introduced. And it was such a success that a new company had to be formed to carry on the business it brought in.

Big Contributor—In the development of electrical induction furnaces, he has made many important contributions to metallurgy. His work has led to improved methods of melting metals with improved quality and closer control of constituents of alloys.



DR. G. H. CLAMER: An inventor, leader and administrator.

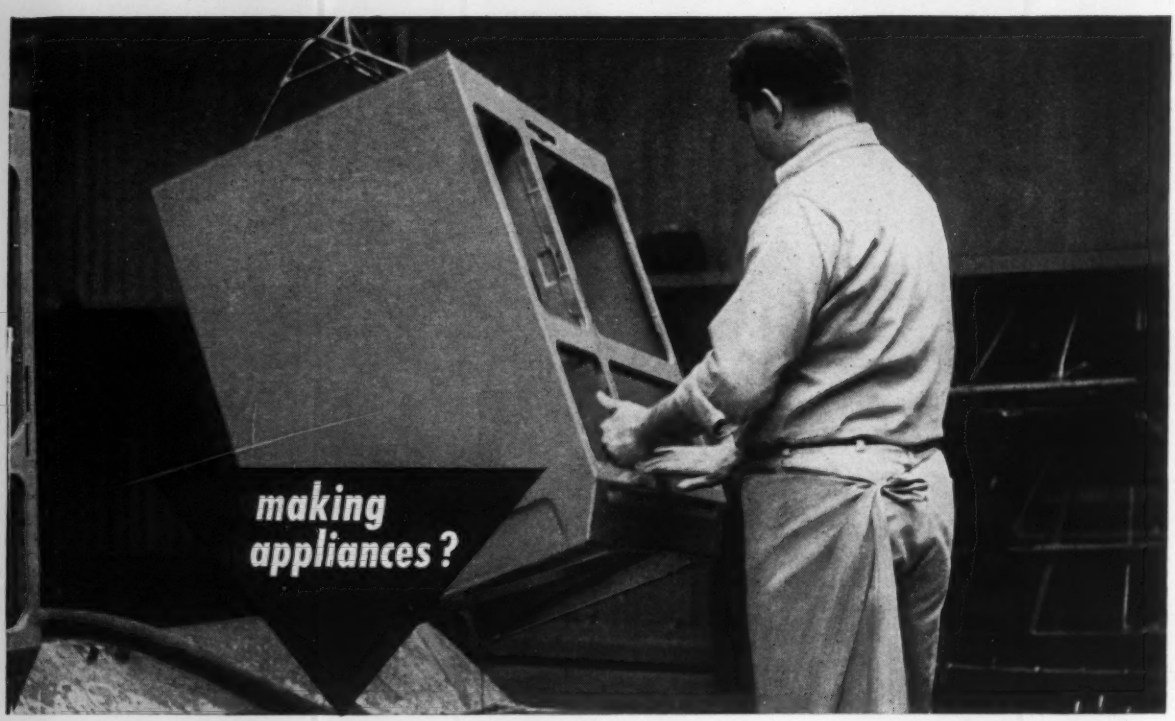
In 1920 he was named president of Ajax Metals Co., now Ajax Electro Metallurgical Corp., and its affiliates.

Long List—Dr. Clamer is a charter member of the American Electro-Chemical Society, one of the original American members of the British Institute of Metals, and a member of the Metals Div. of the American Institute of Mining and Metallurgical Engineers.

He is also a past president of the American Society for Testing Materials and was elected an honorary member in 1937. He has been a member of ASTM since 1902. Through his presidency of ASTM, his work with committees on copper and copper alloys and nonferrous metals and alloys and his activity in other groups, Dr. Clamer has made great contributions to the advancement of standardization.

Still Going—Not too long ago Dr. Clamer resigned his position with Ajax and today serves the industry as an industrial consultant.

His value to the nonferrous scrap industry is highly recognized. Last December he was awarded the International Phoenix Award of the Philadelphia Metals Assn. It was the first award of its kind to be presented by the association.



Pennsalt system approach makes finishing dollars go further

Ever take a close look at what your plant spends to prepare metal surfaces for finishing? As a typical appliance manufacturer, you'll spend $100,000 or more each year for metal preparation chemicals . . . and have several million dollars invested in the equipment in which they're used.

To get the most from this considerable investment, you need to be sure your machines and chemicals are working together. And that's what you get with Pennsalt's System Approach to metal surface preparation. Because Pennsalt supplies both the chemicals and the equipment, we can treat your metal finishing line as an integrated system . . . to make your investment pay off in peak production, top quality and low unit cost.

We make sure you keep getting top performance, too . . . with Pennsalt's Metal Preparation Service Plan. Our complete, personalized service, from a nationwide organization of experienced men, analyzes your metal preparation needs, recommends the right equipment and chemicals, aids installation and startup of automatic machines and follows up with regular service calls. Write for free booklet 344, "The Pennsalt Metal Preparation Service Plan."

Pennsalt Metal Finishing Equipment

Washers
Automatic coating machines
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Complete finishing systems

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Cleaners for all metals
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Cost-Price Squeeze Will Stay

Increasing costs are going to keep whittling away at your profit margins.

Price increases would ease the squeeze, but competition makes them difficult.

■ Costs, prices, and profits are going to get more of your attention from now on.

Finding ways to beat the increasing cost-price squeeze will be difficult. If your business is typical of many others, the profit margin has been decreasing.

Even if sales are better, converting these into improved earnings isn't easy. And the rise in costs will keep making it more difficult.

Labor Costs Rise — Wage increases will go on adding to expenses. Even in companies where base wage rates have been granted, many contracts will give employees further automatic or deferred wage increases this year.

Unions may emphasize more related benefits (hospitalization or insurance) rather than actual wage hikes. But the net result is still going to be an increase in manufacturing costs.

Price Increases? — The obvious answer would seem to be price increases. But right now this is not the obvious answer. Sales competition makes it difficult.

There is little point in boosting prices only to cut down sales volume. Making the problem tougher is the increased competition from imports. And many industries (steel, for example) can now easily outproduce market requirements.

All this may lead in the early 1960's to what has been labeled "prosperity with a problem" or "the most competitive economy in U. S. history."

New Cost Study—How costs and profits react to changes in the business cycle is explored in a new study of the National Bureau of Economic Research.

Its author, Thor Hultgren, points out, "The widespread increases in cost during the early stages of a business recession must be reflected in smaller (profit) margins . . . the economic climate of a developing depression is hardly favorable to higher prices."

He continues: "But in later stages, declines in cost permit wider margins in most industries. . . . As the volume of production declines, industries can use their newer facilities and leave the older and less efficient ones idle. Sometimes the improvements enable an industry with declining volume to raise efficiency and reduce labor cost."

Will Defense Spending Help?

■ The new freeze in the cold war is bound to boost defense spending. But how much impact will this spending have on the economy this year? Can it take up some of the sales slack which has held down the boom?

Rescue Value Small—Economist Eliot Janeway, who has made a study of the "defense cycle," doesn't believe so. Commenting on the pattern to come, he says, "Nothing could be more reckless or ill-advised for the balance of the year than assuming defense is coming to the rescue of a receding economy or a shaken stock market."

He notes the defense factor is not necessarily an economic stabilizer, such as money policy or Social Security. "It can speed up when the economy is in high gear, and it can peter out just when the economy is slowing down—as, in fact, is happening right now."

Three Reasons — Despite the Summit crisis, there are three reasons why defense spending increases won't be an important influence for a while, Mr. Janeway says. First, few programatic decisions on defense have yet been made in response to the new diplomatic blowoff. Second, the time is rapidly running out on the decision-making process until after the elections. Third, even if any new defense decisions are made before the political conventions, their consequences wouldn't be felt until 1962 at the earliest.

Output Rose Slightly During May

Industrial production moved up in May, reversing a three-month decline. The Federal Reserve Board's index for last month (seasonably adjusted) was 110, (1957=100). The May index was 1 point higher than April's and above May, 1959.

It was also only 1 point below the index of 111 for January, 1960, which is the year's high so far. May output of consumer goods returned to record January levels.

LPR's can give you as much as 40 miles of non-stop fabricating, depending on wire size

Still using brite wire in traditional mill-weight bundles?

Look at these *LPR benefits as reported by users who broke the small coil habit

● Work stoppages for coil changes and set-up adjustments cut as much as 95% ● Cumulative coil-remnant scrap trimmed to the bone. ● Manhour costs dropped 20% and more. ● Unloading time, in one case, reduced 75%; other material handling savings from 16 to 50%. ● Coil storage space reduced 15 to 20%, inventory management improved. ● Productivity boosted, in one case, 33⅓%: One man now runs four cut-off machines against 3, previously. ● "Returnable-carrier" annoyances and small storage racks eliminated.

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Customer "REP" Offices in Principal Cities

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"Using 150 to 400 pound bundles was like busy city driving—stopping, block after block, for stop signs and light changes . . . LPR fabricating is more like turnpike traveling. We just keep going for miles at a stretch—saving time, temper and, above all, costs."

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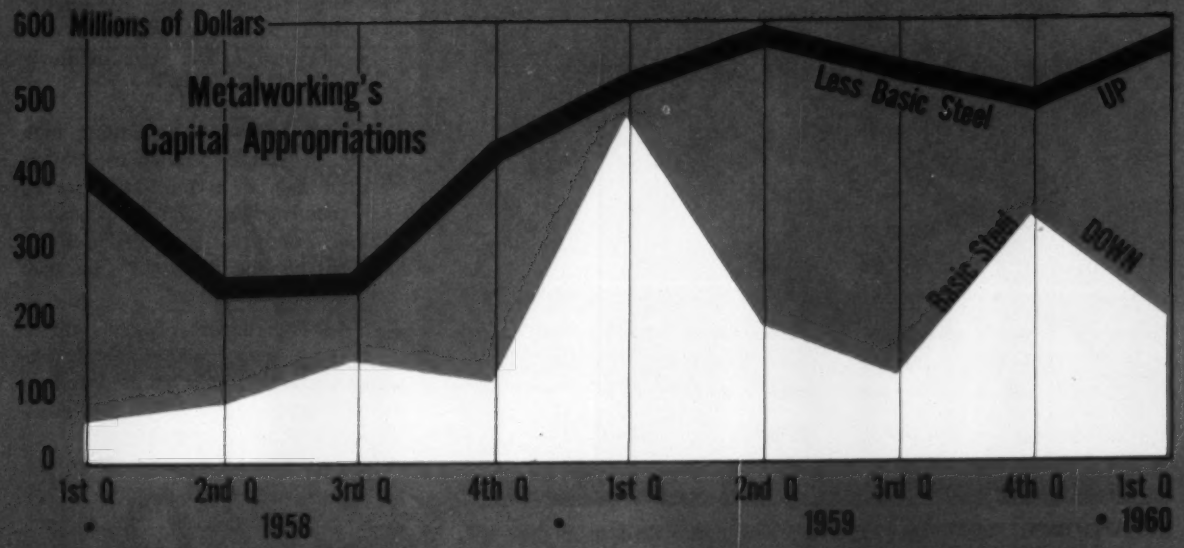


Second Half Capital Spending: Steel Slows, Others Show Gains

Steelmakers cutback new capital appropriations in the first quarter.

But most other metalworking industries posted an average gain of 12 pct over a year ago. —By E. C. Beaudet.

■ In the first quarter the steel industry marred an otherwise bright picture for plant and equipment spending in metalworking for the rest of the year.

As a whole, the industry laid plans to spend $1.2 billion for capital goods in the months ahead. This is 10 pct less than the amount set aside in fourth quarter '59 and 25 pct below the same period a year ago.

The first quarter dropoff is due almost entirely to the slackening pace of appropriations in basic steel. The chart at the top of the page pretty much tells the story.

Most Groups Gain — With steel out of the picture, the outlook for higher capital spending in metalworking is brighter. Overall, the first quarter trend is up.

Most of the industries within metalworking appropriated more money for capital goods than they did in the fourth quarter of 1959 and at the same time a year ago.

Excluding steel, first quarter appropriations by all other metalworking groups combined rose 12 pct over year-earlier levels—and more than held their own with the last quarter of 1959.

'61 Outlook—With high backlogs of appropriations on hand, industry can be expected to keep

Second of a 1960 Series:
Metalworking's Capital Spending Plans

THIS REPORT is the second of a 1960 series of quarterly surveys conducted for The IRON AGE by The National Industrial Conference Board.

NEXT SURVEY — What metalworking will have set aside for future spending by midyear will be reported in September.

SLOWDOWN: Steelmakers cut back new appropriations in first quarter.

capital goods orders flowing briskly throughout 1960.

Whether this will carry over into 1961 depends on the steel industry's ability to reverse the first quarter setback; and if other metalworking groups can improve, or at least hold, first quarter gains.

Slowdown? — There are some signs of a slowdown in the rate at which some industries are approving new appropriations.

But this is offset by a low rate of appropriations cancellations, and a more confident tone noted recently in some management quarters.

More insight into the capital spending picture for next year will be obtained in the next quarterly survey.

High Level—A continuing high rate of capital spending in 1960 is foreshadowed in this latest survey of metalworking capital appropriations conducted for THE IRON AGE by the National Industrial Conference Board.

A breakdown of the major industry groups within metalworking shows that most have stepped up their spending plans over first quarter 1959.

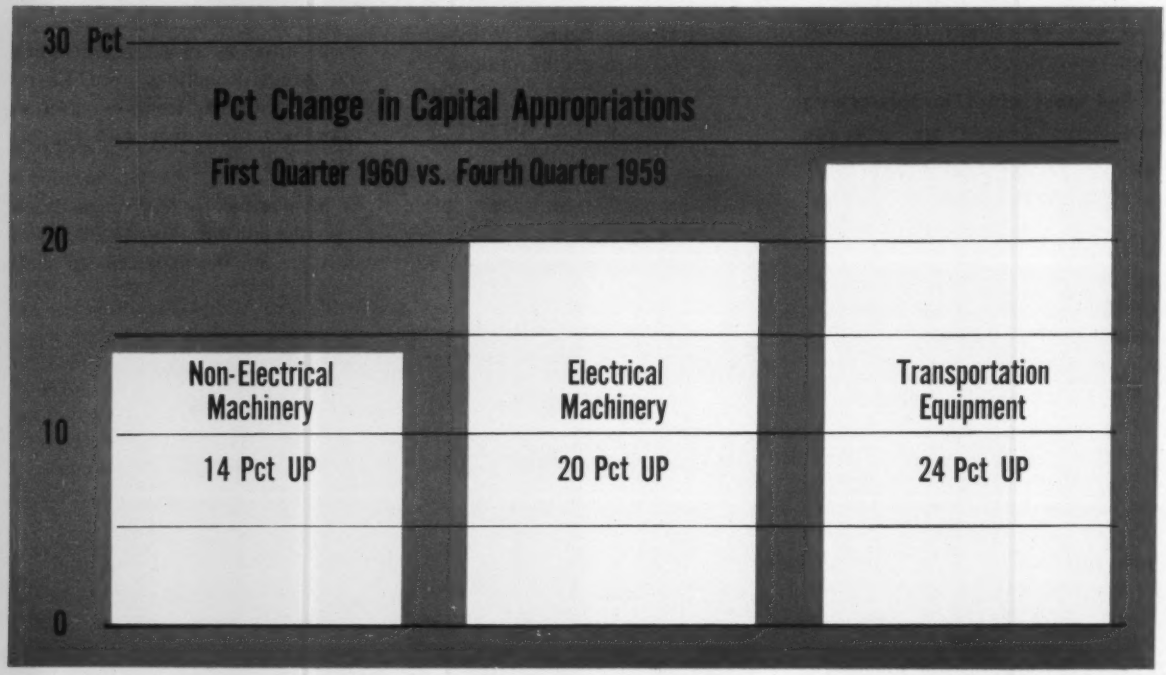
Fabricated metals are up 19 pct; nonelectrical machinery, up 3 pct, electrical machinery, up 41 pct; transportation equipment, up 17 pct; and instruments, up 6 pct.

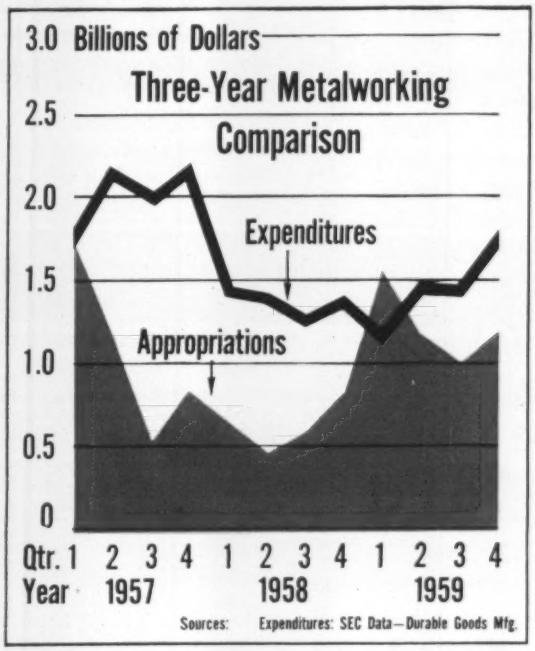
Primary Metals Off—Lone exception is the primary metals industry. In this group a 51 pct drop from first quarter '59 was precipitated by a 59 pct cutback by the steel industry.

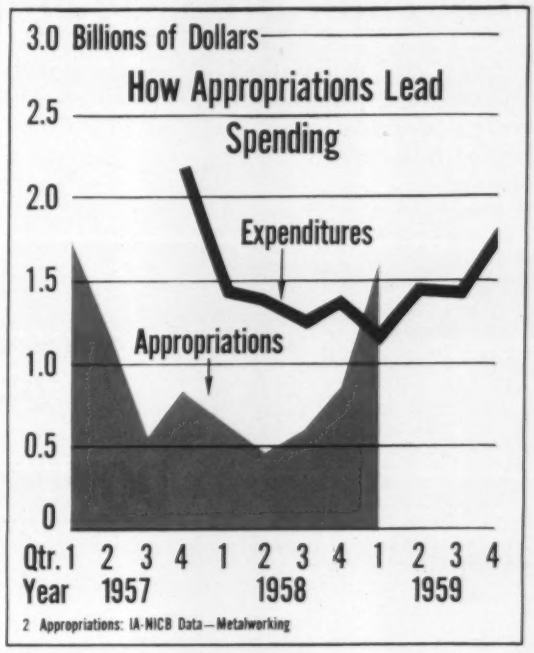
The first quarter '60 steel decline

(Continued on page 76)

These Major Groups Made Biggest Gains







How Appropriations Run Ahead of Orders

Capital appropriations are important figures to watch in gaging the future level of demand for capital goods.

If we know how much management has earmarked for new plants and equipment, we have a pretty good idea of the future course of actual spending.

Appropriations set-asides represent top management's basic decisions to spend money for capital goods at some time in the future.

Top Approval — The amount of money must be approved, however, by top management: The board of directors; the executive committee; and chief executive and financial officers.

These dollar amounts are not opinion, guesses or estimates. Once approved, appropriations set-asides are formally entered on company records. From these records capital spending budgets are made.

As appropriations dollars are spent they become expenditures. In metalworking, capital appropriations lead actual expenditures by nine to twelve months.

The two charts at the top of this page show how this works out. They compare appropriations in metalworking with expenditures by manufacturers of durable goods reported to the Securities and Exchange Commission.

Trace Trend — The chart at left traces the trend in appropriations from 1957 through 1959. You'll notice that at the beginning of 1957 both expenditures and appropriations were at about the same level.

Then, in the second quarter, new appropriations plunged while expenditures continued to gain until the fourth quarter of the year.

You will recall the sharp drop in actual capital goods spending which touched off the 1958 recession. The chart shows this dropoff was foreshadowed nine months earlier by the appropriations decline.

On the upturn, appropriations again lead expenditures. The pick-up began in third quarter '58 while expenditures did not turn upward until the second quarter of 1959—nine months later.

Sharper Focus—A clearer picture of this relationship can be gained from the chart at the right.

As pointed out earlier, appropriations run about nine months to a year ahead of actual spending. So, we have dropped nine months from the beginning of the expenditures curve and another nine months from the end of the appropriations curve.

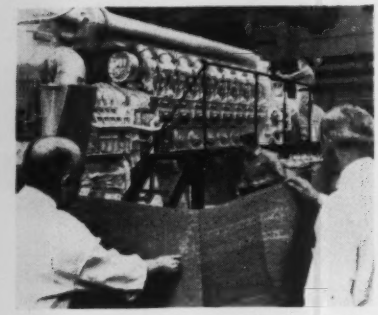
When this is done, you'll notice the shape of the two curves are almost identical. The lead time is quite noticeable.

(Continued from page 74)

What Finer Breakdown Reveals

The finer (3-digit) industry breakdown in this survey shows up shifts in spending plans which could not be detected from broader (2-digit) industry totals.

For example, manufacturers of non-electrical machinery as a whole boosted new appropriations by 14 pct from fourth quarter '59 to the first quarter of this year. But spending plans by industries within this group (SIC 35) varied widely:



Engines & Turbines
(SIC 351)

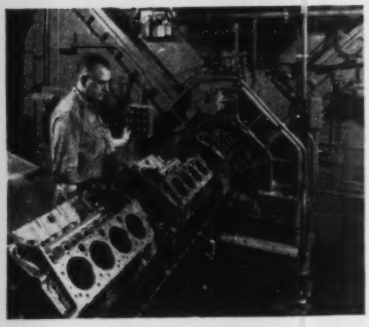
DOWN—58 Pct

Construction, Mining & Mat. Hand. Equip.
(SIC 353)

UP—265 Pct

Office, Accounting & Store Machines
(SIC 357)

DOWN—44 Pct



Metalworking Mach. & Equipment
(SIC 354, 359)

UP—118 Pct

came after a high fourth quarter which was topped by huge funds set aside by steel companies in the first quarter of 1959.

With two big quarters last year, the steel industry was almost forced to catch its breath and allow expenditures to catch up with appropriations backlogs. In fact, orders are still flowing for capital goods from these huge set asides.

Other Causes — Other factors, too, played a heavy part in the decline of capital appropriations by the steel industry.

By the time the first quarter ended, steel users were committed to low inventory policies. With money tight, the steel strike settled, and no immediate sign of a steel price increase, users were in no hurry to rush into the steel market.

So with the "soaring sixties" not getting as high off the ground as anticipated, the steel industry set its first quarter capital appropriations against a backlog of declining steel orders.

Nonferrous Metals — Similar forces were also at work in the nonferrous metals industries during the first quarter.

Nonferrous smelters cut new appropriations 46 pct below year-ago levels. And a drop of 14 pct was made by those companies engaged in rolling, drawing and extruding nonferrous metals.

These two groups, along with steel, account for the lion's share of plant and equipment spending in the primary metals field. So, even though increases were made by ferrous and nonferrous foundries and forge shops, they were hardly enough to offset the decline.

Fabricated Metals—Metal fabricators, however, did better in earmarking new funds for future capital spending than the primary metals producers.

(Continued on page 79)

New Capital Spending Plans for 38 Industries

Major Metalworking Groups

Industry	SIC Code	Capital Appropriations—$ Millions 1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	Pct Change 1st Qtr. 1960 over 4th Qtr. 1959	Pct Change 1st Qtr. 1960 over 1st Qtr. 1959	Pct Change 1st Qtr. 1959 over 1st Qtr. 1958
Metal Furniture	25	$ 0.5	$ 1.6	$ 9.2	$ 1.6	$ 1.5	$ 1.6	+1 Pct	n.c.	+1 Pct
Primary Metals	33	137.5	543.9	250.1	178.7	378.9	265.0	−30	−51	+408
Fabricated Metal Products	34	47.8	47.6	38.1	41.4	71.6	56.5	−21	+19	+60
Machinery (except Electrical)	35	139.0	143.1	121.1	128.9	129.7	147.4	+14	+3	+52
Electrical Machinery & Equipment	36	75.9	62.7	92.2	120.5	74.0	88.6	+20	+41	+37
Transportation Equipment	37	119.9	165.2	236.4	168.0	155.7	193.6	+24	+17	+1
Instruments, etc.	38	9.2	15.4	14.8	8.0	10.9	16.4	+50	+6	+96
Total Reported[1]		529.8	979.5	761.9	647.1	822.4	769.2	−6	−21	+118
Total Estimated for All Metalworking[2]		$820.0	$1,620	$1,190	$1,010	$1,340	$1,210	−10 Pct	−25 Pct	+83 Pct

Based upon returns from 484 companies reporting 718 separate industry groups.
[1] Excludes ordnance and accessories, SIC Code 19, and miscellaneous metal manufacturing, SIC Code 39.
[2] Estimated for entire metalworking universe. This includes metalworking firms operating at least one plant employing 500 or more production workers in 1957. See coverage table, page 80.
Source: The National Industrial Conference Board

Fabricated Metal Products

Industry	SIC Code	Capital Appropriations—$ Millions 1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	Pct Change 1st Qtr. 1960 over 4th Qtr. 1959	Pct Change 1st Qtr. 1960 over 1st Qtr. 1959	Pct Change 1st Qtr. 1959 over 1st Qtr. 1958
Metal Cans	341	$ 18.5	$ 12.0	$ 12.8	$ 9.6	$ 16.2	$ 22.2	+37 Pct	+85 Pct	+69 Pct
Cutlery, Tools, Hardware	342	3.8	3.1	2.5	10.7	29.6	3.2	−81	+3	+327
Heating Apparatus (exc. elec.) & Plumbing Fixtures	343	3.1	4.1	2.9	3.2	3.8	3.7	−3	−11	+1
Fabricated Struct. Products	344	8.8	6.6	6.7	6.0	9.9	14.9	+51	+126	+4
Screw Products & Rivets	345	4.2	1.9	4.0	2.3	3.7	2.1	−43	+15	+6
Stampings	346	4.7	15.7	5.2	6.7	5.0	5.0	n.c.	−68	+309
Coating, Engraving; Misc. Fabr. Wire Prod.	347,348	0.3	0.7	.14	0.3	0.9	1.8	+100	+148	−67
Miscellaneous Fabricated Metal Products	349	4.5	3.4	2.7	2.6	2.6	3.5	+35	+2	−6
Total	34	$ 47.8	$ 47.6	$ 38.1	$ 41.4	$ 71.6	$ 56.5	−21 Pct	+19 Pct	+60 Pct

Transportation Equipment

Industry	SIC Code	Capital Appropriations—$ Millions 1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	Pct Change 1st Qtr. 1960 over 4th Qtr. 1959	Pct Change 1st Qtr. 1960 over 1st Qtr. 1959	Pct Change 1st Qtr. 1959 over 1st Qtr. 1958
Motor Vehicles & Equip[1]	371,375, 379	$ 47.2	$ 96.2	$190.1	$127.5	$ 97.9	$120.9	+23 Pct	+26 Pct	−5 Pct
Aircraft & Parts	372	67.6	60.5	43.3	34.9	55.0	65.6	+19	+ 9	+18
Ship & Boat Building	373	3.8	6.4	1.5	2.5	1.6	4.3	+169	−32	−22
Railroad Equipment	374	1.3	2.1	1.4	3.1	1.2	2.7	+125	+25	−28
Total	37	$119.9	$165.2	$236.4	$168.0	$155.7	$193.6	+24 Pct	+17 Pct	+1 Pct

[1] Includes motorcycles, bicycles and parts, and miscellaneous transportation equipment.

Electrical Machinery

Industry	SIC Code	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	Pct Change 1st Qtr. 1960 over 4th Qtr. 1959	Pct Change 1st Qtr. 1960 over 1st Qtr. 1959	Pct Change 1st Qtr. 1959 over 1st Qtr. 1958
		Capital Appropriations—$ Millions								
Elec. Transmission Equip.	361	$ 17.7	$ 8.3	$ 11.1	$ 56.3	$ 15.1	$ 8.4	−44 Pct	+2 Pct	−7 Pct
Elec. Indus. Apparatus	362	15.2	9.0	25.8	7.3	11.4	17.2	+51	+90	+1
Household Appliances	363	3.6	8.6	10.6	6.1	4.3	7.1	+65	−17	+17
Electric Lighting & Wiring Equipment	364	5.1	2.8	5.4	3.1	6.7	6.8	+1	+143	+23
Radio & TV Receivers	365	4.1	1.4	3.8	5.9	2.5	3.2	+28	+124	+30
Communication Equipment	366	6.3	10.1	10.1	28.2	14.7	13.1	−11	+30	+19
Electronic Components	367	23.0	21.1	22.9	12.4	18.3	31.9	+74	+51	+173
Misc. Electrical Equip.	369	1.0	1.3	2.4	1.3	1.0	0.8	−20	−37	+32
Total	36	$ 75.9	$ 62.7	$ 92.2	$120.5	$ 74.0	$ 88.6	+20 Pct	+41 Pct	+37 Pct

Primary Metal Industries

Industry	SIC Code	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	Pct Change 1st Qtr. 1960 over 4th Qtr. 1959	Pct Change 1st Qtr. 1960 over 1st Qtr. 1959	Pct Change 1st Qtr. 1959 over 1st Qtr. 1958
		Capital Appropriations—$ Millions								
Blast Furnaces, Steel Wks. & Rolling Mills	331	$104.8	$464.0	$182.0	$112.7	$331.6	$191.1	−42 Pct	−59 Pct	+799 Pc
Iron & Steel Foundries	332	6.4	10.0	8.2	8.9	8.5	13.4	58	+34	+71
Primary Smelt. Nonferrous Metals	333,334	4.9	31.9	28.4	33.0	17.5	17.4	n.c.	−46	n.c.
Rolling, Drawing, Extruding Nonferrous	335	17.8	33.9	25.2	13.6	16.0	29.1	82	−14	+148
Nonferrous Foundries	336	0.2	0.8	3.8	7.3	1.9	4.7	147	+466	−66
Misc. Primary Metals	339	3.4	3.3	2.5	3.2	3.4	9.4	176	+180	+84
Total	33	$137.5	$543.9	$250.1	$178.7	$378.9	$265.0	−30 Pct	−51 Pct	+408

[1] Includes secondary nonferrous smelters, SIC 334.

Nonelectrical Machinery

Industry	SIC Code	1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	Pct Change 1st Qtr. 1960 over 4th Qtr. 1959	Pct Change 1st Qtr. 1960 over 1st Qtr. 1959	Pct Change 1st Qtr. 1959 over 1st Qtr. 1958
		Capital Appropriations—$ Millions								
Engines & Turbines	351	$ 8.4	$ 23.3	$ 7.0	$ 5.9	$ 23.6	$ 9.9	−58 Pct	−57 Pct	+292 Pct
Farm Machinery & Tractors	352	13.4	18.9	14.2	11.8	12.9	10.4	−19	−45	+262
Construction, Mining, Handling Equipment	353	58.2	34.0	27.9	11.7	12.7	46.3	+265	+36	+27
Metalworking Machinery & Equipment[1]	354,359	5.8	9.0	6.7	11.1	6.2	13.5	+118	+50	+38
Special Indus. Machinery	355	9.2	9.6	18.3	10.9	8.7	9.5	+9	n.c.	−28
General Ind. Machinery & Equipment	356	9.3	24.9	16.1	37.1	15.7	28.2	+80	+13	+57
Office & Store Machines	357	32.6	21.0	27.7	35.6	46.9	26.3	−44	+25	+9
Service Industry Machines	358	2.1	2.4	3.1	4.8	3.0	3.1	+3	+31	+63
Total	35	$139.0	$143.1	$121.1	$128.9	$129.7	$147.4	+14 Pct	+3 Pct	+52 Pct

[1] Includes miscellaneous, nonelectrical machinery, SIC Code 359.

Instruments

Industry	SIC Code	Capital Appropriations $ Millions 1958 4th Qtr.	1959 1st Qtr.	1959 2nd Qtr.	1959 3rd Qtr.	1959 4th Qtr.	1960 1st Qtr.	Pct Change 1st Qtr. 1960 over 4th Qtr. 1959	Pct Change 1st Qtr. 1960 over 1st Qtr. 1959	Pct Change 1st Qtr. 1959 over 1st Qtr. 1958
Laboratory, Scientific & Engineering Instruments	381	$ 2.2	$ 5.3	$ 4.7	$ 2.5	$ 4.7	$ 5.1	+9 Pct	−3 Pct	+157 Pct
Measuring & Controlling Instruments	382	4.0	6.2	7.8	3.6	3.6	5.2	+44	−16	+66
Other[1]	383,384, 385,386, 387	2.9	3.9	2.3	1.9	2.6	6.1	+135	+55	+90
Total	38	$ 9.2	$ 15.4	$ 14.8	$ 8.0	$ 10.9	$ 16.4	+50 Pct	+6 Pct	+96 Pct

[1] Includes optical instruments, surgical instruments, ophthalmic goods, photographic equipment and watches, clock-operated devices, SIC codes 383, 384, 385, 386, 387.

First quarter capital appropriations in this industry ran 20 pct higher than amounts approved a year earlier. The largest gains in the group were made by metal can makers and fabricators of structural steel products.

Steel Pinch—Steel shortages in late 1959 plus a high demand for cans caused manufacturers of these products to increase appropriations 37 pct over fourth quarter '59 and 37 pct higher than the first quarter.

Fabricators of structural steel products also moved quickly after the steel settlement. The high rate of construction in industrial building and heavy engineering works spurred them to boost capital spending plans in the first quarter of this year to a 15-month high.

Nonelectrical Machinery—In the first quarter the nonelectrical machinery industry increased its capital appropriations slightly over the same quarter in 1959. But signs of increasing strength were shown by the 14 pct gain over the previous quarter.

Groups leading the advance in nonelectrical machinery capital appropriations include manufacturers of: Construction, mining and material handling machinery; metalworking machinery and equipment; general industrial machinery; and business and computing machines.

The biggest reason for the upturn, must be credited to makers of construction and material handling equipment.

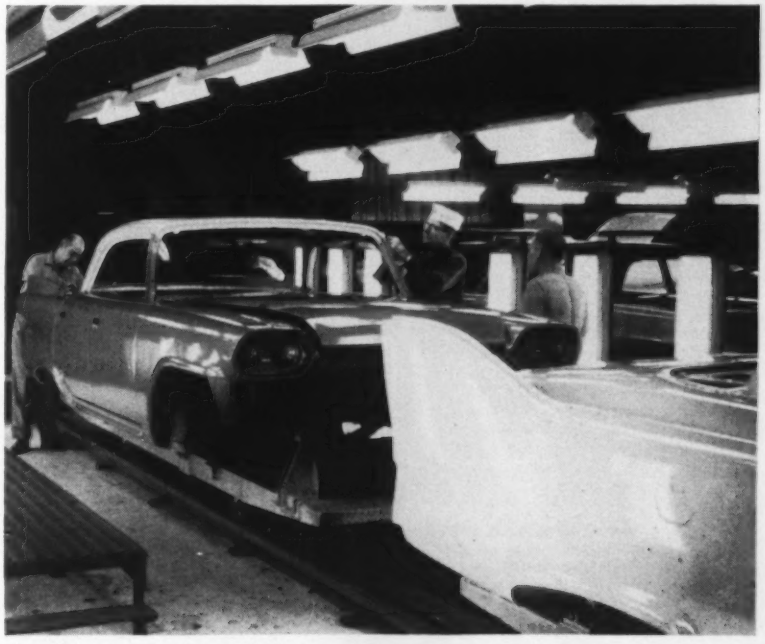
This high degree of confidence, built on improved sales in the last half of 1959, was enough to overcome the weakness in appropriations by the depressed mining machinery industry.

More Groups Up — Other plus factors in the nonelectrical machinery industry show: Capital appropriations by metalworking machinery and equipment makers, up 118 pct; special industrial machinery, up 9 pct; general industrial machinery, up 80 pct; and service industry machinery, up 3 pct—higher than the previous quarter.

On the downside of the appropriations picture can be counted makers of turbines and engines, down 58 pct; farm machinery and tractors, down 19 pct and office, computing and store machines, down 44 pct.

Electrical Machinery—The electrical machinery industry seems bent on another high round of capital spending. The industry overall bettered its first quarter 1959 showing by over 40 pct in the first quarter of this year.

This upsurge reversed a fourth



PICKUP: Automakers boosted spending plans 25 pct in first quarter.

Reporting Plants Pass 1,200 Mark*

All companies in the industries listed below, with plants of 500 or more plant workers, were queried. They account for about two-thirds of the total employment and buying power in the metalworking industry. The last column shows the percentage of production workers employed by the companies cooperating in this survey. The last column shows appropriations per production worker.

Industry and SIC Code	Production Workers, Thousands	Production Workers, Thousands	Pct of Total Employment	Appropriations per Production Worker,[1] $
	Companies With Plants of 500 or more	Cooperating Companies	Cooperating Companies	
Metal Furniture, 251, 252, 253, 254, 259	31	12	38 Pct	
Blast Furnaces, Steel Works, Rolling Mills, 331	595	312	52	$2,618
Iron and Steel Foundries, 332	81	61	75	640
Primary & Secondary Smelting, Nonferrous, 333, 334	54	50	92	1,934
Rolling, Drawing, Extruding, Nonferrous Metals, 335	113	80	71	1,043
Nonferrous Foundries, 336	19	13	67	1,412
Misc. Primary Metals, 339	37	22	59	845
Metal Cans, 341	47	45	95	1,364
Cutlery, Hand Tools, Hardware, 342	54	35	65	1,296
Heating Apparatus (except elec.) & Plumb. Fixtures, 343	21	21	63	630
Fabricated Struct. Prods., 344	60	30	50	1,248
Screw Prods. & Rivets, 345	26	15	60	792
Stampings, 346	75	54	71	409
Coating, Engraving; Miscellaneous Fabricated Wire Products, 347, 348	21	10	47	449
Msl. Fab. Metal Prods., 349	54	36	66	322
Engines & Turbines, 351	71	58	82	798
Farm Mach. & Tractors, 352	60	34	56	1,455
Construction, Mining Handling Equipment, 353	111	80	72	1,239
Metalworking Machinery & Equipment, 354, 359	107	66	62	570
Special Industry Mach., 355	47	24	51	2,014
General Industrial Machinery & Equipment, 356	90	58	67	1,611
Office & Store Machines, 357	78	58	74	2,371
Service Ind. Machines, 358	38	22	59	622
Elec. Trans. Equip., 361	90	49	54	1,873
Elec. Ind. Apparatus, 362	133	65	48	954
Household Appliances, 363	97	46	48	611
Electric Lighting & Wiring Equipment, 364	55	30	54	738
Radio & TV Receivers, 365	72	28	40	544
Communication Equip., 366	113	52	46	1,284
Electronic Components, 367	95	62	65	1,380
Misc. Elec. Equipment, 369	27	8	30	674
Motor Vehicles & Equip., 371, 375, 379	638	546	86	982
Aircraft & Parts, 372	522	484	93	411
Ship & Boat Building, 373	61	31	50	325
Railroad Equipment, 374	43	26	61	319
Laboratory, Scientific & Eng. Instruments, 381	41	16	39	1,076
Measuring & Controlling Instruments, 382	41	26	64	771
Other, 383, 384, 385, 386, 387,	77	20	26	634
Total	4,020	2,673	67 Pct	

*Based upon returns from 484 companies reporting 718 individual industry codes. Employment figures based on Iron Age Census data, 1957. Figures in last column calculated from unrounded data. A total of 1,207 plants with 500 or more workers reported. This is a new record for companies, plants and SIC codes reported.

[1] In dollars per production worker, based on appropriations made from first quarter 1959 through third quarter 1959 and plant employment of reporting companies in 1957.

SOURCE: The National Industrial Conference Board.

quarter '59 downturn, raising first quarter appropriations some 20 pct above the previous quarter. The only cutbacks from a year ago in the eight-industry group were made by household appliance manufacturers and producers of miscellaneous electrical equipment.

Raise Sights—But on a quarter-to-quarter basis, appliance makers once again raised their sights 65 pct over fourth quarter 1959.

Of all the electrical machinery group, the radio and television industry made the most striking gains in new capital appropriations in the first three months of 1960.

Compared with the same quarter in 1959, the industry raised its spending plans by 124 pct. And it reversed a 40 pct drop from the third to fourth quarter last year by coming back with a 20 pct gain in first quarter 1960.

Transportation Equipment—During the first quarter capital appropriations by the transportation equipment industries topped fourth quarter '59 by about 25 pct. And they also ran 17 pct higher for this industry than the amounts set aside in first quarter '59.

But these gains may not be enough to offset the downward trend in appropriations by the industry which started in the third quarter of last year.

Leading the first quarter upturn, was the automotive industry which planned to spend about 25 pct more for new plants and equipment than it did in both the first and fourth quarters of last year.

Momentum Slows—Despite this rise, however, the first quarter '60 **rate of improvement** was not as high on a year-to-year basis as those of 1959 and 1958.

Compared with a year ago, manufacturers of aircraft and aircraft parts raised capital appropriations 9 pct in the first quarter.

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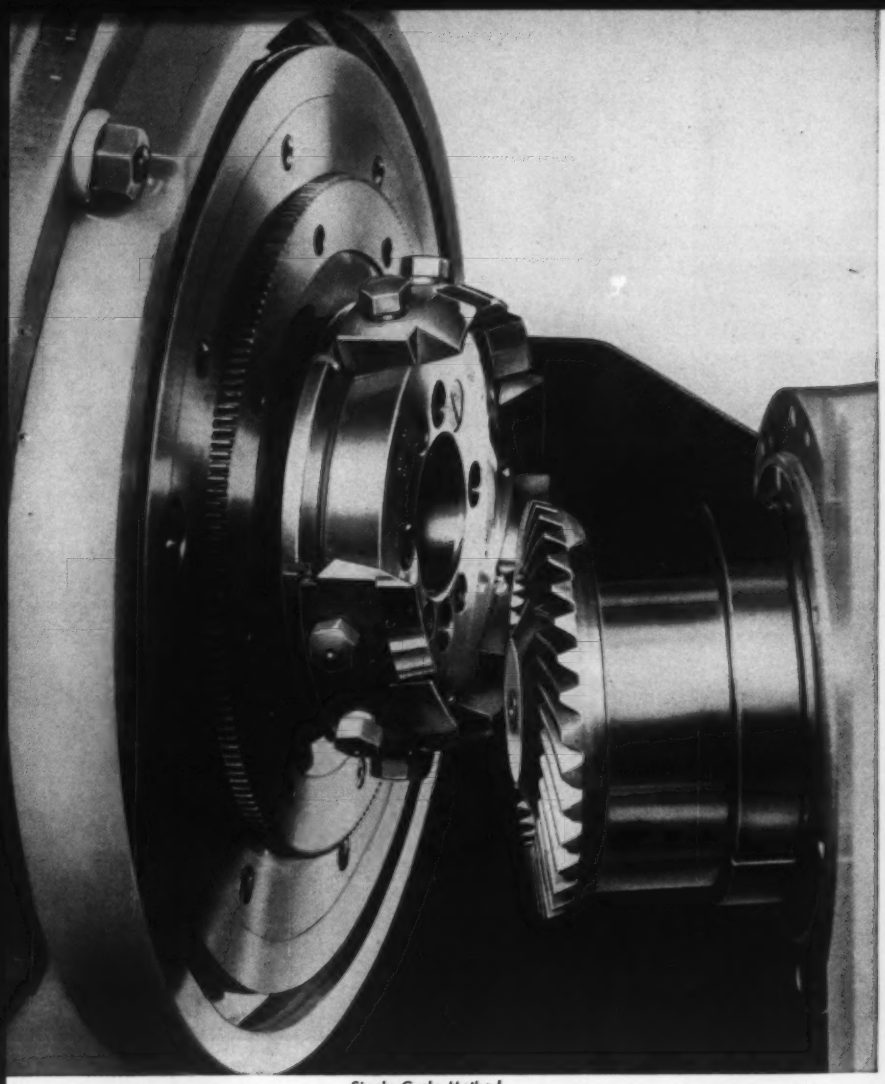
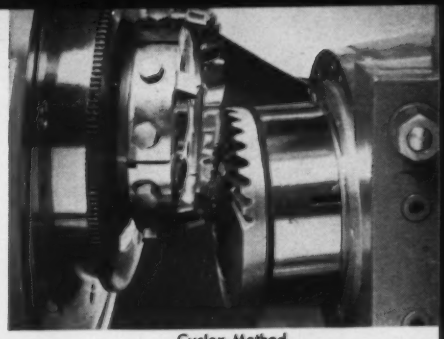
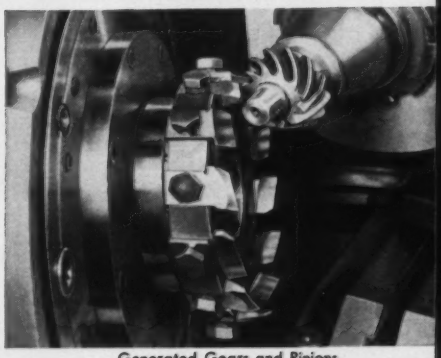


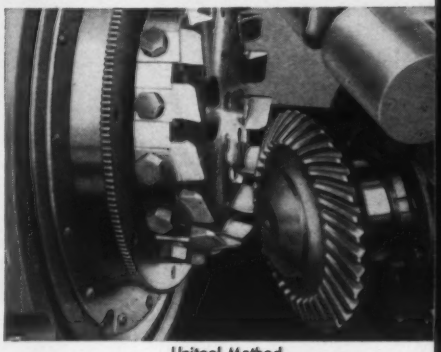
Single Cycle Method



Cyclex Method



Generated Gears and Pinions



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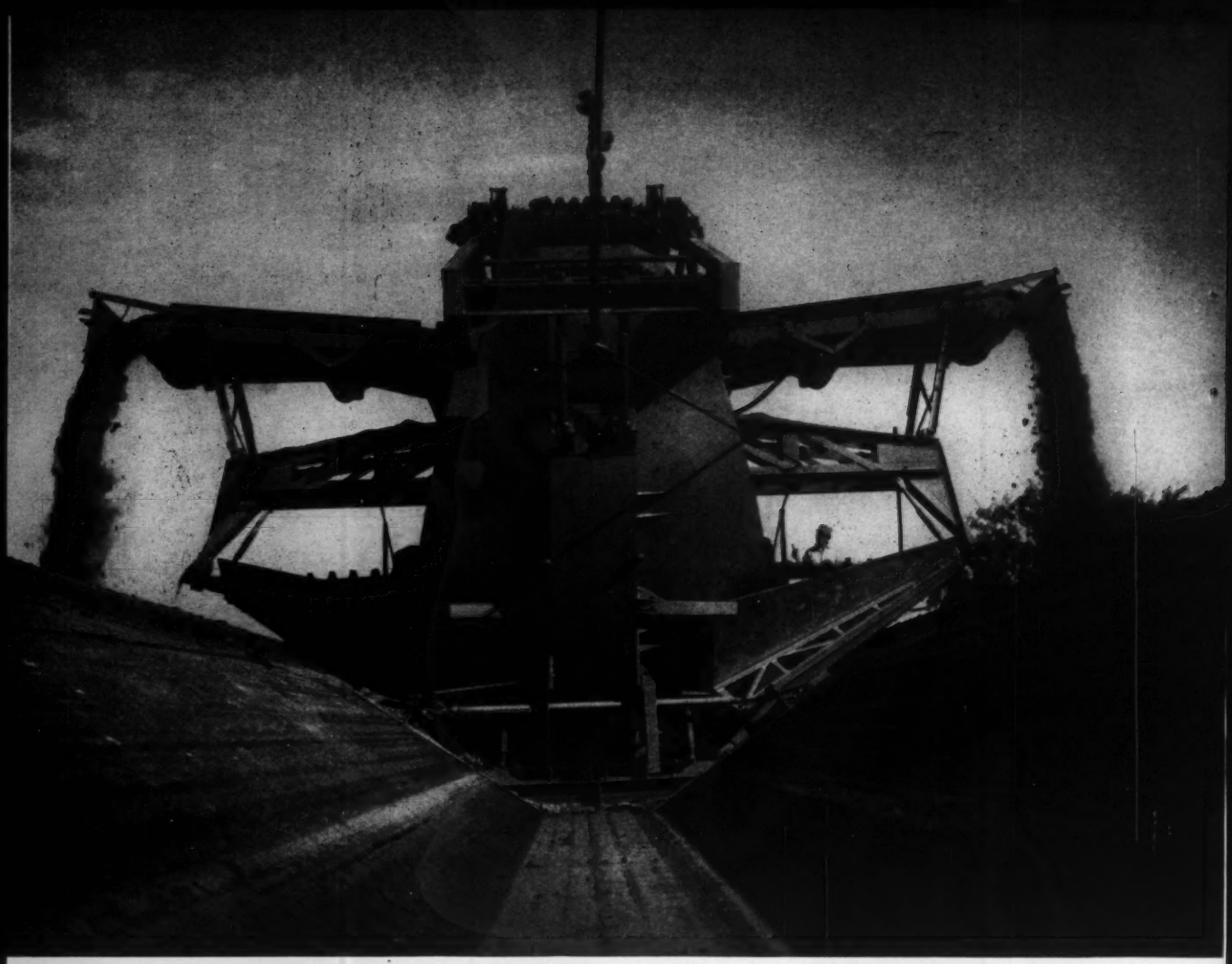

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How Chevy Builds Corvair Engine

Company Saves About $250,000 With Hot Metal

Since they first heard about it, metalworking reporters have tried to get the production story of Chevrolet's aluminum engine.

Last week the company let outsiders inside its casting and engine facilities for the first time.—By A. E. Fleming.

▪ The molten aluminum deal between Chevrolet and Reynolds Metals Co. in Massena, N. Y., is working out well for both parties.

The General Motors division gets delivery of the hot, liquid metal in amounts tailored to Corvair engine production. Reynolds unloads millions of pounds of aluminum monthly with little effort to a neighbor three-quarters of a mile away.

The cash saving for Chevrolet is large. It is 10 pct cheaper for the company to buy molten aluminum than ingot, or cold form, aluminum. Put another way, Chevrolet saves from 0.5¢ to 1.5¢ a pound by eliminating the job of melting aluminum ingots in order to make castings for the Corvair engine.

Significant Savings—The amount of the savings is apparent when shipment figures are looked at. Since Corvair engine output began in May, 1959, to June 10 of this year, 3,662,000 castings containing 24,851,000 lb of aluminum were shipped. At an average of a cent a pound, this comes to a saving of nearly $250,000.

The decision by Chevrolet to put a foundry in Massena was made several years ago, when plans for the Corvair were forming. The site was attractive for two reasons: There would be a steady supply of molten aluminum from the then-proposed Reynolds reduction plant. And low cost electric power would be available from facilities then being developed on the St. Lawrence river, a few miles away.

Fast Service—Today the Chevrolet Massena plant has 195,000 sq ft of production area and employs 715 persons. It turns out 15 different automotive castings, 14 of them for Corvair. Products go to Tonawanda, N. Y., Toledo, Cleveland and Flint.

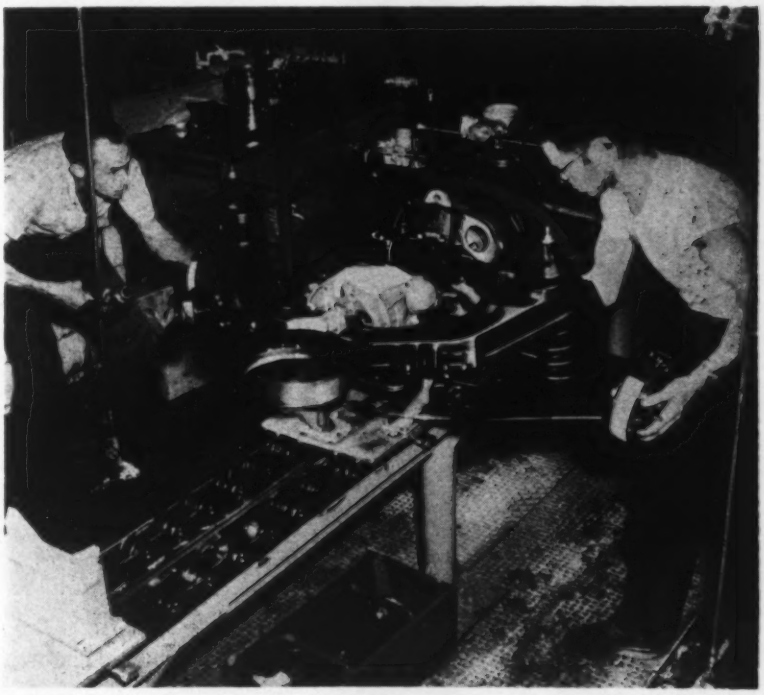
Molten aluminum is sent on a truck over a private road connecting the Chevrolet and Reynolds plants. One truck is used. It carries two ladles, holding a total of 17,000 lb of liquid aluminum.

It takes only seven minutes for a delivery from Reynolds to Chevrolet. A phone call from Chevrolet, boast Reynolds officials, can bring shipment in less than 20 minutes. This includes tapping aluminum from a furnace, inspecting the molten metal, putting the ladles on the truck, and running them over to the casting plant.

Casting Techniques — Chevrolet uses the liquid aluminum for conventional die casting, conventional permanent mold casting and low-pressure permanent mold casting.

Die cast parts include flywheel housings, crankcase covers, idler brackets, oil cooler adapters and automatic transmission stators and clutch housings.

Permanent mold castings are used for pistons and camshaft gears;



POWER TRAIN: Air-cooled aluminum engine, transmission and rear suspension are installed as one unit in Chevrolet's compact Corvair.

low-pressure permanent mold casting is used for making crankcase halves, rear engine housings, oil filter and generator adapters, and cylinder heads for Corvairs, plus Corvette clutch housings.

European Process—Corvair cylinder heads are among the most intricate aluminum castings made in the U. S. Controversy arose last year over the low-pressure method. Critics said it wasn't the best way to turn out the delicate, finned jackets that go around the iron alloy cylinder liners in the engine. Problems did arise. But now the castings are beautifully made, even though the fins are only 0.22 in. apart.

The low-pressure process employs modifications of the method used for quite some time in European foundries. It is an intermediate step between die casting and permanent mold casting. Chevrolet has 81 low-pressure molding machines. Pressures up to 10 lb per sq in. force the aluminum smoothly and slowly into the mold cavity.

Advantages Cited — Chevrolet says it is using the process for these reasons: Castings are almost entirely free from porosity and shrinkage; yields are high because large gates (entries) and risers (overflows) are not needed, saving costs of removing and remelting them; one man can run more than one machine; initial costs are cheaper than die casting, about the same as permanent mold casting equipment; castings are cleaner, relatively free of oxides.

The molten metal concept practiced by Chevrolet and Reynolds has done plenty towards stepping up the use of aluminum in U. S. cars. It shows there is a way to provide a ready supply of the metal in amounts needed for mass production.

Reserve Capacity — The aluminum plant has three potlines, only two are operating. Capacity is 67,000 tons a year. Chevrolet uses about one-third of the output in the form of molten aluminum. Pig, ingot and billet products also are made there. They go to foundries, extruders and independent fabricators in New York; to Reynolds' extrusion plants in Richmond, Va., and Grand Rapids; and to Reynolds' McCook Sheet and Plate Mill near Chicago.

Reynolds employs about 500 when running at two-thirds capacity as it is now. As yet Reynolds hasn't used the St. Lawrence Seaway for shipments to and from Massena. But Monroe Wells, vice president of the company, says studies are going on concerning the feasibility of building a dock and using the Seaway for inbound shipments of alumina and other raw materials, and outbound shipments of finished metal.

Engine Plant—When will Reynolds open the third potline that will boost capacity to 100,000 tons a year? "I can't set a date," says Mr. Wells. "We'll start it as soon as demand for aluminum increases enough to require it. We hope it'll be soon."

The Corvair engines, which are the reason for all the Massena activity, are produced at Tonawanda, N. Y., near Buffalo. Since the first Corvair engine came off the line in June, 1959, around 230,000 powerplants have been shipped.

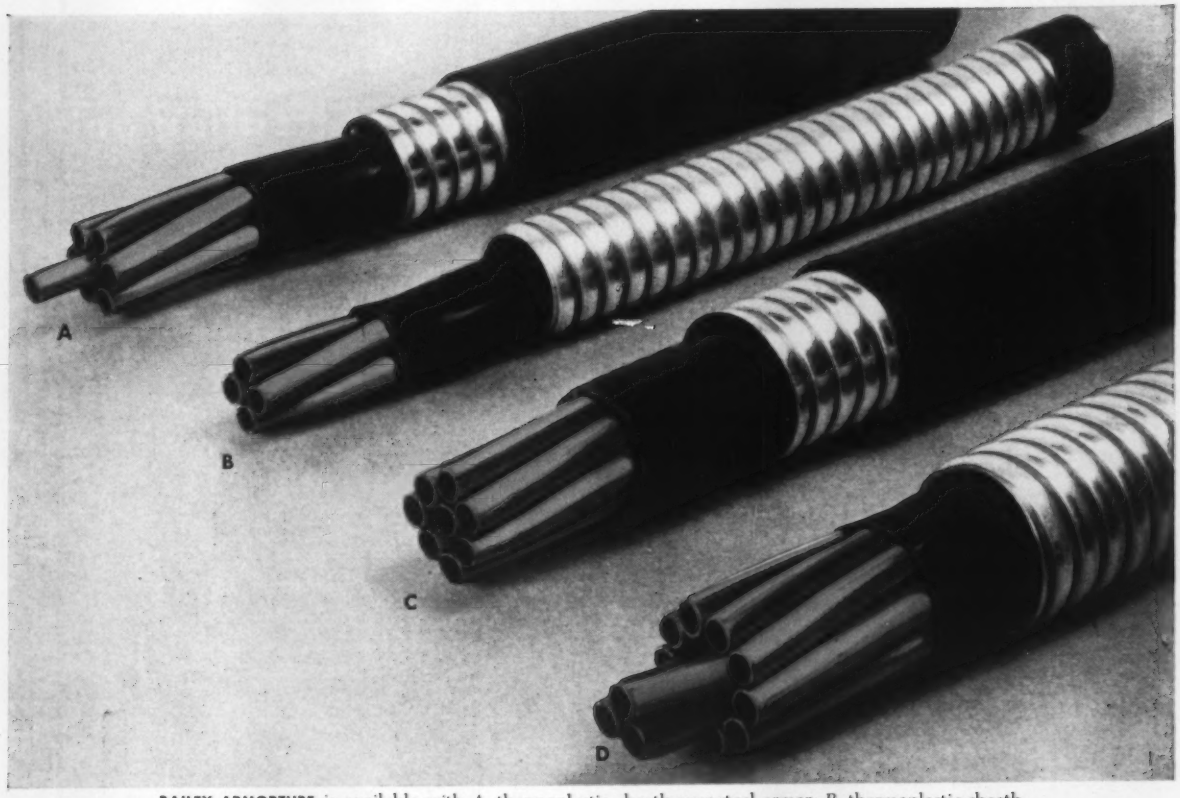
Some 350 machines are assigned to the Corvair production at Tonawanda. An engine assembly line 600 ft long is one of the largest in the country.

Tooled for Aluminum — The aluminum engine has brought problems with it. For instance, deburring of aluminum parts poses much more of a machining problem than cast iron. But a transfer-type de-burring machine is now used.

Machines installed for Corvair output are powered for high-speed, heavy-feed cutting of aluminum. Central coolant systems are set up to lubricate cutting tools and flush chips from the parts and the machines working on them.

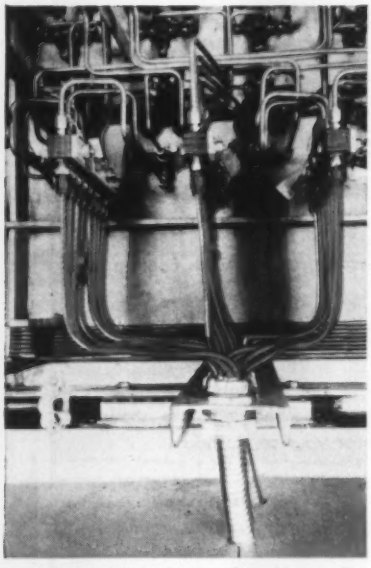
Imports Invade Light Truck Market

MADE IN ENGLAND: This half-ton pick-up truck is one model of the 1960 Atlas line that is being imported from England. It gives up to 25 mpg on urban multi-stop runs, turns completely around in a 29 ft circle. It's made by Standard-Triumph International, Ltd.



BAILEY ARMORTUBE is available with *A*, thermoplastic sheath over steel armor; *B*, thermoplastic sheath under steel armor; *C*, thermoplastic sheath over and under steel armor; or *D*, with just steel armor.

For its "Armortube" control system cables, Bailey specifies Anaconda precision copper tube in long coils



A TYPICAL INSTALLATION of Bailey Armortube in a large utility, indicating the large number of separate lines carried by two easily installed cables.

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The Danger of Panic Spending

Budget Director Says It Threatens Stability

Director of the Federal budget warns against panic spending as the result of Khrushchev's act.

Too much spending threatens economic stability with no benefit.—By G. H. Baker.

▪ A top Administration official is sounding fresh warnings against frantic bursts of government spending every time Khrushchev throws a tantrum.

Trying to hold things in check is Maurice H. Stans, director of the budget. He points out the fallacy of believing the U. S. must match the U.S.S.R. rate of growth: The Soviet Union, having started with next-to-nothing only 30 years ago, obviously is registering a faster rate of growth than nations that have been moving ahead industrially for more than 200 years.

The Real Danger — "Let's not make serious mistakes by overstressing the meanings of recent Soviet growth," Mr. Stans warns. Despite rapid growth in Russia, the Reds are still far less industrialized than the U. S. It is a matter of record that Communism has failed to approach capitalism in economic development and standard of living, he points out.

As Mr. Stans sees it, the real danger confronting U. S. leaders is that the U. S. may move away from conservative fiscal policies and enter a period of government spending without purpose.

There's a Limit—The military and the government scientific operations can only absorb limited amounts of spending money each year. Yet some "leaders advocate giant increases in appropriated funds of all types, without any understanding of just how the extra sums can be utilized."

These men are trying to hypnotize the nation into "blindly following the cult of growth," the budget director warns, "without inhibitions about balanced budgets, or big debts, or inflation."

Lobbying Costs May Be Deductible

Business groups paying for lobbying activities could get a tax break. That is, if a bill which has won House Ways and Means Committee approval can get floor action before Congress' early July adjournment.

The bill would permit lobbying costs—money spent to influence state legislatures, Congress, and voters in referenda—to be deducted from gross income.

Organized labor is opposing the bill. The U. S. Treasury Dept., however, is not objecting though the bill will remove a Department ban on lobbying tax deductions imposed last December. If the bill reaches the White House—which is doubtful with the short time left in the session—the Treasury Dept. apparently would recommend that the President sign it.

How to Waste Tax Money

▪ Failure of executives to communicate with one another is always an expensive error. In government, the cost can be considerably higher than in industry.

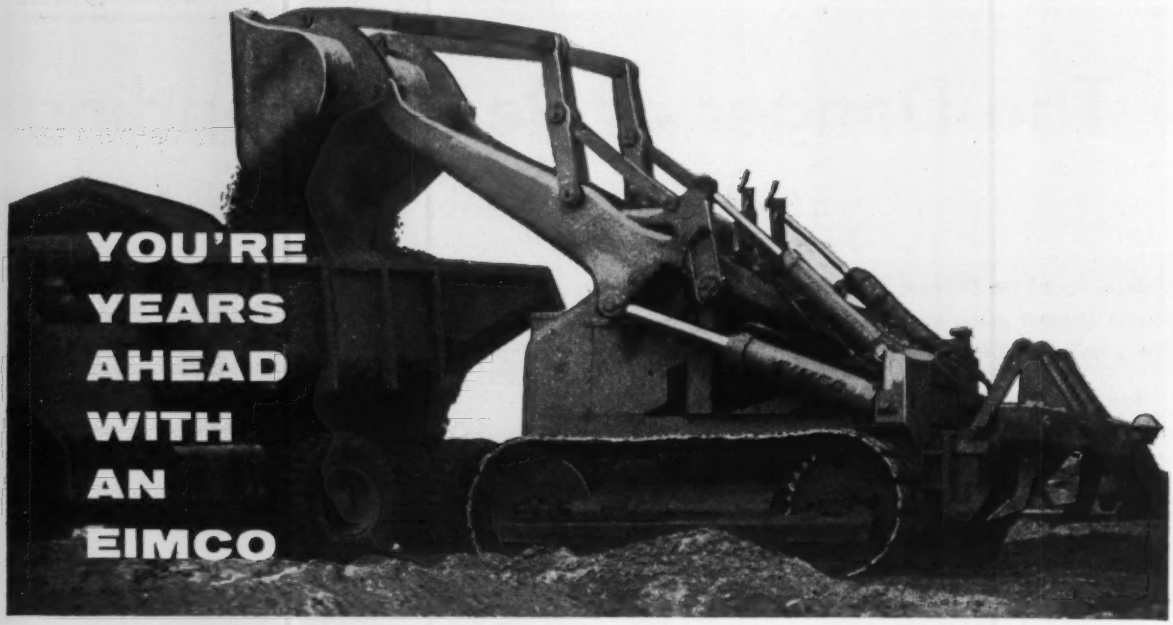
The U. S. Comptroller General —watchdog for public money— says the taxpayers have just been nicked for $16 million by two government agencies. Both were working on a similar project. Neither was willing to discuss its performance with other government agencies, with the public, or with the press.

$16 Million Wasted—The agencies—Air Force and National Aeronautics and Space Administration—both were developing a second-stage rocket for moon probes. Finally, because the Air Force got further ahead, the NASA reluctantly dropped its own variation of the project, but not until $16 million had been spent.

Although both the Air Force and the NASA are deeply involved in missile projects of all types, there is an appalling lack of communication between the two.

Total Loss—Says the Comptroller General: This is not a case of calculated pursuit of two alternative courses. It was simultaneous and separate development toward the same end.

Because the work was similar and in some aspects identical, no new discoveries or progress can be attributed to the duplicate projects. The $16 million is a total loss. It can be blamed entirely on lack of communication among executives who should be in frequent and frank communication with each other.



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Will Labor Pact Set Pattern?

Agreement Reflects Changes in Aerospace Industry

After months of bargaining, the UAW and aerospace firms sign two-year contracts.

Union was willing to settle for wage increase less than half of its original demands. — By R. R. Kay.

■ Two settlements may point the way to labor peace in the aerospace industry.

After months of union-management talks, North American Aviation and the United Auto Workers signed a new two-year contract worth 17¢ an hour more.

That's less than half the union's original demands.

Douglas Aircraft, at several of its plants, also signed with the UAW at substantially the same terms.

How come? Right from the start of the negotiations, the unions knew that they couldn't bargain from a position of strength. Both union membership and industry employment are shrinking.

Rough Times — The aerospace industry is still going through a painful transition. Gone is volume production. Now it's short runs of sophisticated weapons.

Along with this change, employment is down 22 pct. From here on, aerospace companies will need mostly highly-skilled factory workers, engineers, and scientists.

Patternmaker? — This union-management hassle has been going on for two months. The International Association of Machinists and the United Auto Workers are the spokesmen for 90 pct of the Farwest's aerospace workers—some 250,000.

The North American Aviation agreement might be the pattern to settle the union disputes with the other major companies: Boeing, Convair, and Lockheed.

Missile Housings Go Underground

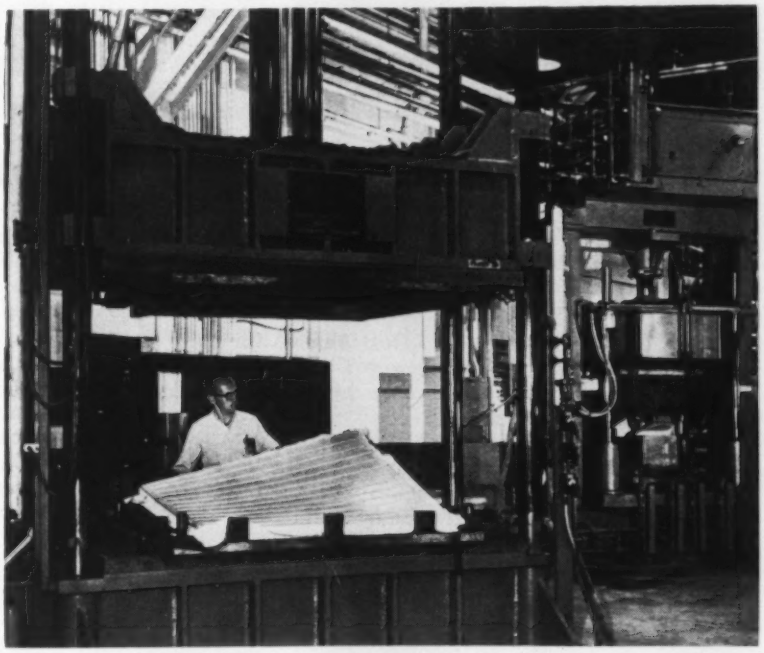
The Air Force is going underground to protect its missiles against blast effects. That's the word from Maj. Gen. O. J. Ritland, Commander, Air Force Ballistic Missile Division, Los Angeles.

Early Titan missiles will be housed in concrete and steel silos below ground level, fueled there, and raised to the surface for launching. For later Titan squadrons, the Air Force is planning an in-silo launch.

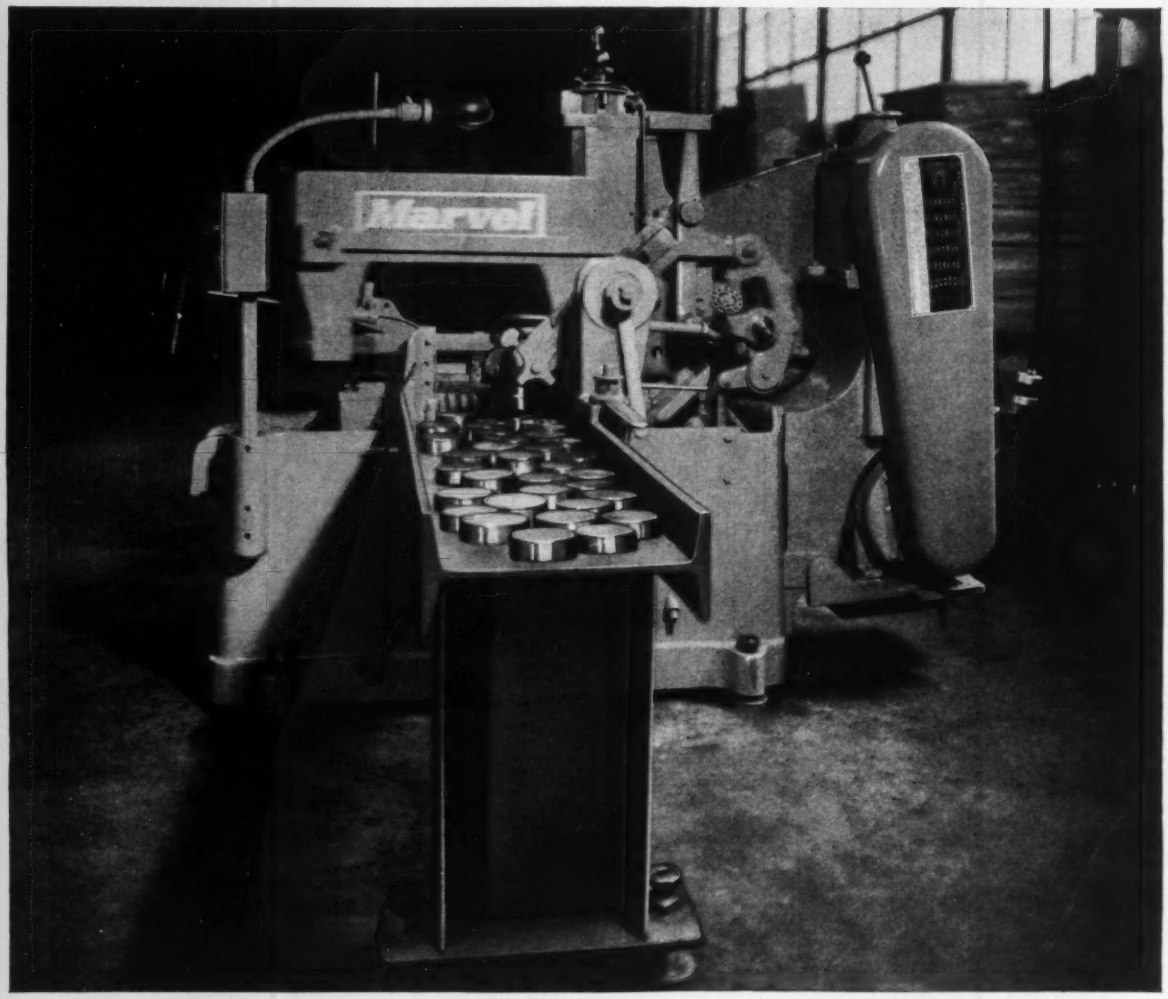
Faster Reaction—This "fire-from-the-hole" method "will greatly increase the speed of U. S. reaction to attack. And it will reduce the vulnerability of the missile during those moments when it would normally be sitting exposed on the pad before launch," the General says.

The Air Force plans to also base the Minuteman at hardened sites—that is, underground. The sites will be widely scattered.

Lockheed Expands Output of Plastics



PLASTIC COMPARTMENT: At Lockheed's new plastics center, operator lifts plastic aircraft forward cargo compartment section from 300-ton capacity press. The plant develops and manufactures aerospace and consumer products, reflects Lockheed's interest in plastics.



Payoff End of a Production Marvel

A cut-off saw's value is proven at the discharge end of the machine. How quickly the trough is filled with accurately cut-off pieces can mean the difference between profit and loss on many jobs.

The R. J. Sudrick Co., Des Plaines, Illinois, manufacturers of precision aircraft components had to cut-off 4600 blanks from 3¼" round, 303 Stainless Steel Bars.

They bought our MARVEL No. 6A4 High Speed Heavy Duty Automatic Bar Feed Hack Saw Machine; used MARVEL High-Speed-Edge Hack Saw Blades, and got the high production, accuracy and economy they desired.

PRODUCTION? Constant at 20 pieces per hour floor to floor

ACCURACY? Held well within the permissible tolerance of +.010 −.000

BLADE COST? Just 1½¢ per cut. Only twenty-three MARVEL blades were needed to make the 4600 cuts, and not a single blade failure due to blade breakage. MARVEL High-Speed-Edge Blades are unbreakable.

The point is this: MARVEL Metal Cutting Hack Saws equipped with MARVEL High-Speed-Edge Hack Saw Blades are an unbeatable combination for economical, accurate and safe cutting-off.

If your hack saws are not producing the economy you need to meet today's competition, try MARVEL High-Speed-Edge Blades. They will give you the competitive edge every time. Write for Catalog C-85 which has the complete story on MARVEL Hack Saws and Band Saws, Hack Saw Blades and Band Saw Blades.

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MARVEL Metal Cutting SAWS

Better Machines–Better Blades

Precision Hone Small Parts

Centerless Machine Promises Low-Cost Microfinishes

Finishing batch lots of small parts often presents a problem, especially if volume is low.

But a new honing unit, using a German technique, may offer a solution.—By R. H. Eshelman.

▪ When a shop handles a variety of small parts in batch lots, finishing can pose a problem. Volume may not be enough to justify special machines nor methods. More stringent demands such as for missile and electronics components have accentuated the need.

Soon to be released now is an ingenious centerless honing unit that could break this bottleneck. It promises fast, low-cost microfinishes and will take a range of parts.

Imported Technique — Being readied by Taft-Peirce Manufacturing Co., Woonsocket, R. I., the grinder utilizes the plunge-cut "microstoning" principle. This technique, developed in Germany, is licensed to the Rhode Island firm.

Up to now, applications have been confined principally to shafts, hubs and similar piece parts that could be handled by lathe and boring mill attachments.

The new unit, however, opens up new production possibilities in precision and microfinish. An example is a stainless steel valve stem.

Automatic Cycling — As produced by screw machining, it had a finish of 30 microinches (rms). Microstoning on the plunge-cut, centerless machine brought it down to a finish of 6 microinches in 23 seconds, in two cycles. The first is an 18 second roughing operation; the finish cycle takes only five seconds.

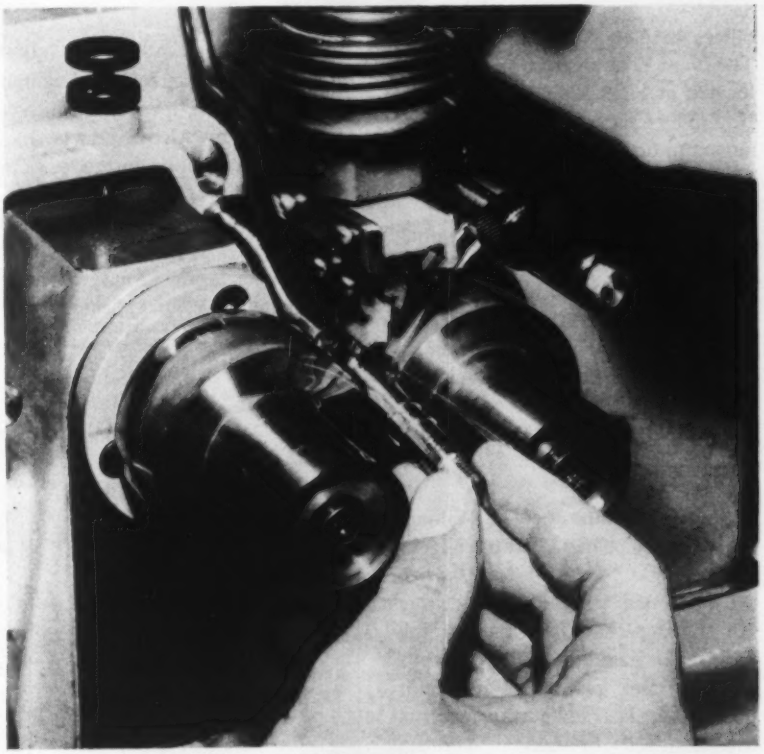
For test purposes the operation was hand loaded. In production, parts are fed and positioned automatically through a feed chute. Also, the machine automatically cycles through the speed changes from rough to finish stages, with part and stone in place.

Uniform Tool Wear—Actual operation is described as a low-pressure, low-temperature abrading with bonded stones. These come in various grit sizes. They are bonded so that the stone shapes itself to the work radius. The tool wears away in a uniform manner, presenting fresh abrasive cutting edges to the work continuously.

For the controlled finish, the process uses a continuous flow of coolant. This is mineral seal oil and machine oil. No stone dressing is required.

Key to Success—Secret of the process is design of the pneumatic system that actuates the head. A free-floating piston inside the head moves in opposition to the body.

The self-balancing principle allows the head to oscillate at high frequencies impossible or unsafe for mechanically driven equipment.



CHANGE OF PACE: Taft-Peirce Centerless Plunge-Cut Microstoning Machine hones a valve stem. Machine automatically cycles, changing speed from rough to finish stage. Part and stone remain in place.

INDUSTRIAL BRIEFS

Scandinavian Accent—The Bettinger Corp., Milford, Mass., processor and fabricator of ceramic-on-metal products, has signed its eighth foreign license agreement with Kockumns Jernverks of Kallinge, Sweden. It is for the exclusive manufacturing and distribution of Bettinger - developed products in Sweden, Norway, Denmark and Finland.

Eyeing the World — Ultrasonic Industries, Inc., Albertson, L. I., New York, has formed a Canadian subsidiary, Ultrasonic Industries (Canada) Ltd., 1512 Eglinton Ave., West, Toronto, Ontario. It is the first of several such companies contemplated by UI in the development of international markets for its diSONtegrator ultrasonic cleaning equipment and other ultrasonic devices.

On the Move — Pressed Steel Tank Co. has moved its district offices in New York and Chicago. The New York district office is now located at 1199 Main Ave., Clifton, N. J. The Chicago district office has moved to 6634 North Western Ave., Chicago 45, Ill.

Exit to Suburbs—Kaiser Aluminum & Chemical Sales, Inc., has transferred its New York district sales office to 190 E. Post Rd., White Plains, N. Y. It was formerly located at 300 Park Ave. Executive offices and New York credit offices will remain at the 300 Park Ave. location.

Slag Car Contract—The William B. Pollock Co. has a contract from Koppers Co., Inc., to furnish five self-propelled steel ladle and slag pot transfer cars. It is part of the Jones & Laughlin Steel Corp.'s oxygen steel plant expansion at Cleveland. The ladle transfer cars are designed to handle 200-ton heats from the new oxygen vessels. The slag cars will handle two pots of 500 cu ft capacity each.

Expands Stamping Plant—H. W. Hutchinson & Son, Inc., has completed a $300,000 expansion of its metal stamping plant at Birmingham, Ala., including installation of a fourth lithographing line. The company last year processed 18,000 tons of steel through three lines. It presently employs 115 persons.

Buy Rare Metals—The Kawecki Chemical Co., Boyertown, Pa., has purchased 50 pct of the common stock of Penn Rare Metals Inc., Revere, Bucks County, Pa. The companies will continue independent production and research operations. Kawecki will take an active part in Penn's management and act as its exclusive sales agent.

Two and One—H. K. Porter Co., Inc., has started a $4 million construction and equipment modernization program at the Bessemer, Ala., and Wellsville, O., plants of its Refractories Div. Major items in the program will include two new tunnel kilns at Wellsville and one at Bessemer.

Spring Center—A new $500,000 production center for cold-wound springs has been opened in Chicago Heights, Ill. by Alco Products, Inc. Cold-wound springs formerly were manufactured at Latrobe, Pa. Springs now produced at Chicago Heights range from the smallest of cold-wound types to large helical and volute hot-wound springs.

"I don't think his write-in campaign is going to work!"

Furnace Line Expanded—Harper Electric Furnace Corp., Buffalo, N. Y., has modernized and expanded its line of elevator furnaces equipped with neoprene-sealed retorts. Thirty-two models are now available for processing a variety of metals at temperatures up to 2300°F. Low dew points can be maintained for critical brazing, annealing, hardening and sintering operations.

Japanese Heat Treat—Adding to the existing heat treating facilities installed in 1959, construction has started at the plant of Nippon Kokan K. K. in Tokyo. It is completing a continuous wide plate heat treating line. Designed by Drever Co., Bethayres, Pa., the new equipment will include pressure quench, tempering furnace and related conveyor tables.

Ore Dispute Over—The Columbia-Geneva Div., U. S. Steel Corp., and Kaiser Steel Corp. have settled a dispute over iron ore mining claims located near Eagle Mountain in the southern California desert. U. S. Steel and Union Steel Co., a subsidiary of Kaiser Steel, have agreed to a joint ownership of the claims.

Alabamy Bound — The Electric Autolite Co. has acquired an 80-acre tract in Decatur, Ala. The company intends to erect a multi-million dollar production facility for the manufacture of light automotive and industrial electrical items. Production facilities will be transferred from Toledo, O. Total investment will be $6 million to $7 million for land, buildings, and equipment.

Stainless in Sweden — Sandvik Steel Works, Ltd., parent company of Sandvik Steel Inc., Fair Lawn, N. J., is building a new tube mill in Sweden for hot extrusion of stainless steel tubing. The new mill is expected to be in operation by 1962. Cost is estimated at $6 million.

Among the thousands of "hardware" products manufactured by the A. B. Chance Company of Centralia, Mo., are eyebolt castings for the electrical industry. These castings require a tough, high strength, corrosion resistant material with low electrical conductivity. Herculoy provided this unique combination of properties.

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Newark: Mitchell 3-0500
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Toronto, Ont., 1110 Birchmount Rd., Scarborough, Phone: Plymouth 73246

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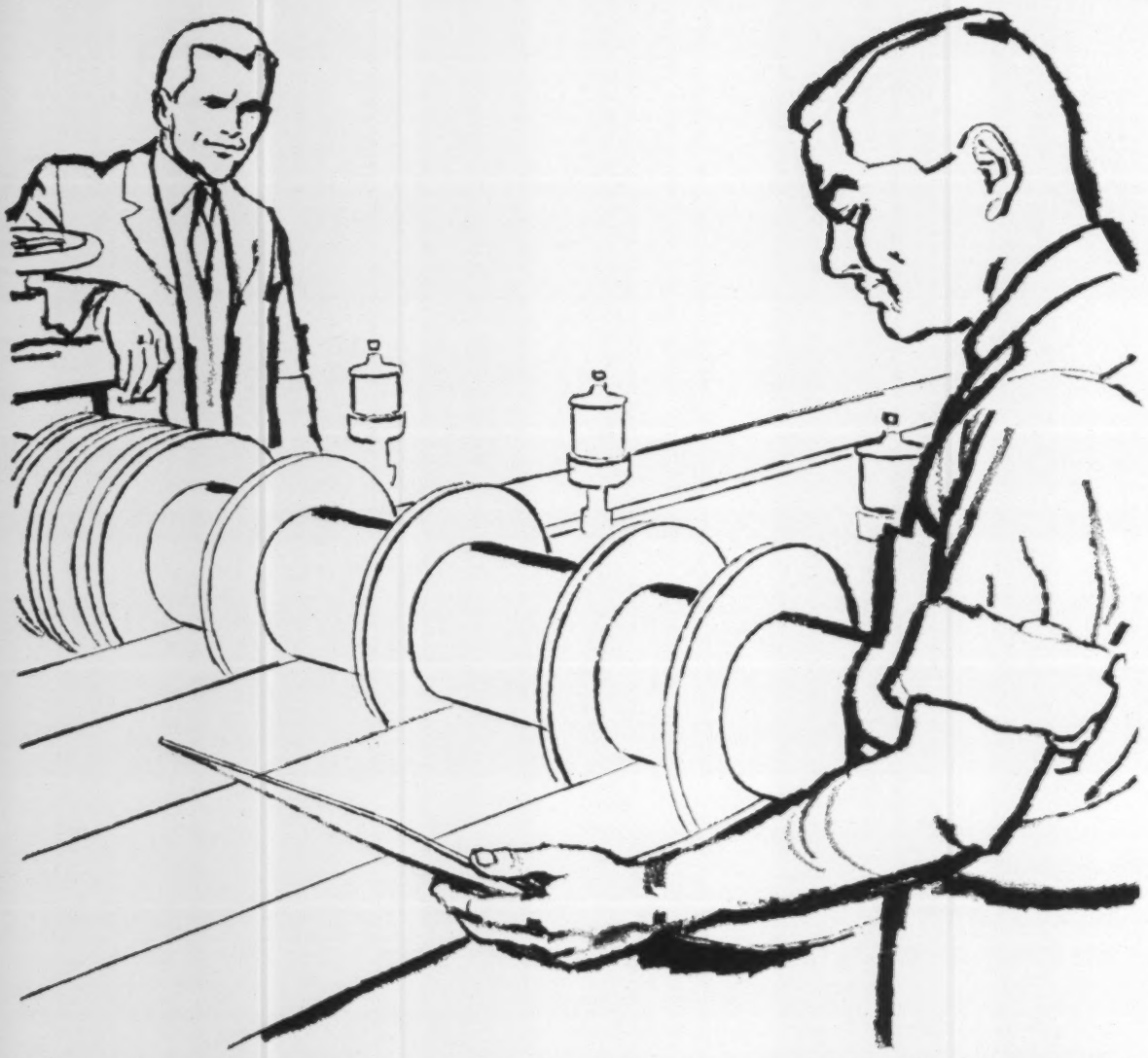

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C. E. Killebrew, elected president, Canadian Clark, Ltd.

Taylor & Gaskin, Inc.—**G. E. Rhodes,** appointed vice president and general manager; **H. E. Wray,** becomes general manager, Indiana Bridge; **G. H. Parker,** becomes asst. general manager, Muncie, Ind.

Olin Mathieson Chemical Corp. —**I. D. Ritson,** appointed director, construction.

Republic Steel Corp. — **T. E. Scott,** appointed asst. superintendent, industrial relations, Warren, O., district.

All-State Welding Alloys Co., Inc. — **Mario Camargo, Jr.,** appointed asst. export manager.

Bowman Steel Corp. — **Stephen Stone, Jr.,** named director, sales.

Dresser Industries, Inc. — **J. D. Mayson,** promoted to vice president and secretary.

Iron Fireman Mfg. Co. of Canada, Ltd.—**J. H. R. Hobbs,** appointed general manager.

Lewis Bolt & Nut Co.— **D. G. Hansen,** named merchandising manager.

American Metal Products Co.— **D. M. Diltz,** appointed manager, automotive sales, Detroit.

Marine and Industrial Engine Div., Chrysler Corp.—**W. C. McDonald,** named chief engineer.

U. S. Steel Corp., Universal Atlas Cement Div.—**E. B. Meyer,** appointed asst. chief engineer.

U. S. Steel Corp.—**J. M. Born,** appointed asst. to manager, sales, Detroit district sales office.

Cooper Alloy Corp., Valve and Fitting Div. — **Michael DePiano,** appointed sales manager.

Allis-Chalmers Mfg. Co.—**L. H. Sence,** appointed chief engineer and **B. R. Lipe,** appointed asst. chief engineer, Centrifugal Pump Dept., Norwood (Ohio) Works.

R. J. Smith, elected a vice president, Canadian Clark, Ltd.

Jones & Laughlin Steel Corp.— **J. A. Heineman, Jr.,** appointed resident manager, sales, Tulsa sales office.

Dayton Industrial Products Co. —**K. I. Frank,** appointed district manager.

North American Refractories Co., Specialties Div.—**J. F. Kane,** appointed chief engineer.

W-K-M Div., ACF Industries, Inc.—**Glen Tableman,** named man-

(Continued on P. 96)

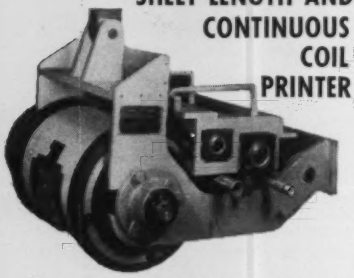
W. I. Senger, promoted to vice president, engineering, Gisholt Machine Co., Madison, Wis.

V. J. Taylor, named a vice president, AmForge Div., American Brake Shoe Co.

R. F. Dunlavey, appointed superintendent, Finishing Dept., Buffalo steel plant, Republic Steel Corp.

MATTHEWS
PRODUCT
PRINTERS

SHEET LENGTH AND CONTINUOUS COIL PRINTER



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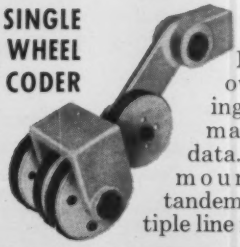

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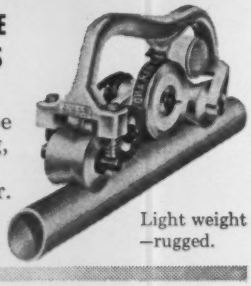

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(Continued from P. 95)

ager, sales, and **P. J. Natho,** named manager, Market Development Dept.

Empire-Reeves Steel Corp.— **F. B. Fairman,** named hot strip mill superintendent.

H. C. Bream, named president and general manager, Western Design, Div. of U. S. Industries, Inc.

Cal-Metal Pipe Corp. of Louisiana—**R. E. Johnston, Jr.,** appointed asst. sales manager.

Hobart Brothers Co.—**J. J. Murphy,** named district representative, Middle Atlantic States.

Beckman Instruments, Inc., Scientific and Process Instruments Div.—**R. J. Manning,** appointed regional application engineer.

Colin Sharp, named director, Research & Development Laboratory, Cutting Tool Div., Brown & Sharpe Mfg. Co., Providence, R. I.

G. C. Strubell, appointed administrative director, metallurgy and research, American Brass Co.

National Supply Co.—**S. A. Shuman,** named asst. to the president.

Eutectic Welding Alloys Corp.—**H. E. Doyle,** appointed field supervisor.

Gregory Industries, Inc.—**R. C. Friedly,** appointed general sales manager, products.

Tennessee Products & Chemical Corp., Metals and Alloys Div.—**John Kranaskas,** appointed chief chemist.

A. W. Bailey, appointed manager, Syracuse plant, The Weatherhead Co.

Parker-Hannifin Corp.—**F. W. Cowdrey,** appointed sales engineer, Southern California sales office.

The Mid-West Abrasive Co.—

(Continued on P. 101)

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MAGNATEST electronic testing for hardness, conductivity, alloy, proximity, and many more. Also for precision magnetic field measurement. And still other methods and techniques, some completely new.

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Here's what happened when Black & Decker Manufacturing Co., Towson, Maryland, switched from alloy grades 4140 and 8620 to J&L Jalcase 100 cold finished bar steel in the production of shafts, gears and pinions for portable electric tools:

- The free machining quality of Jalcase speeded production on automatic screw machines 50%.
- The uniform machinability of high strength Jalcase eliminated ½ hour per shift from machine downtime for tool changes.
- The strength and hardness of Jalcase have practically eliminated the need for subsequent heat treating and resultant part distortion.
- The combination of these production economies plus the lower initial cost of Jalcase over alloy grade steel has greatly reduced parts costs.

The free machining qualities of J&L Jalcase 100 plus its high strength, hardness and stabilized stresses make it an ideal cold finished bar steel for producing high quality machined parts for the metalworking industries.

Jalcase 100 has a minimum yield strength of 105,000 psi in round bar sizes to 1½" diameter and a minimum yield strength of 100,000 psi in sizes to 3½" diameter.

Jalcase 100 has a minimum hardness of 248 Brinell up to 1½" and 241 Brinell for larger sizes. It is also available with a lead addition, designated as Jalcase 100-L, for applications requiring superior machinability.

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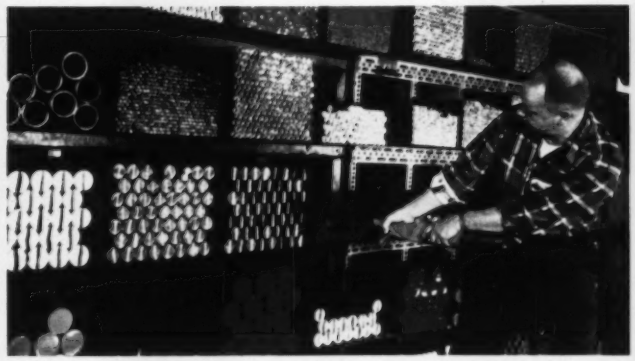
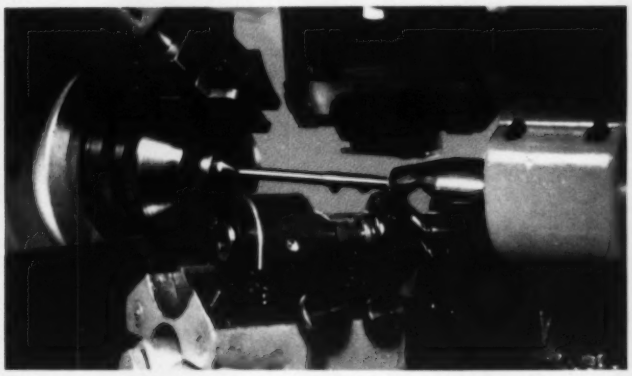


Black & Decker relies on a great variety of J&L bar stock. Over 30 electric tool parts are made from Jalcase 100 alone.

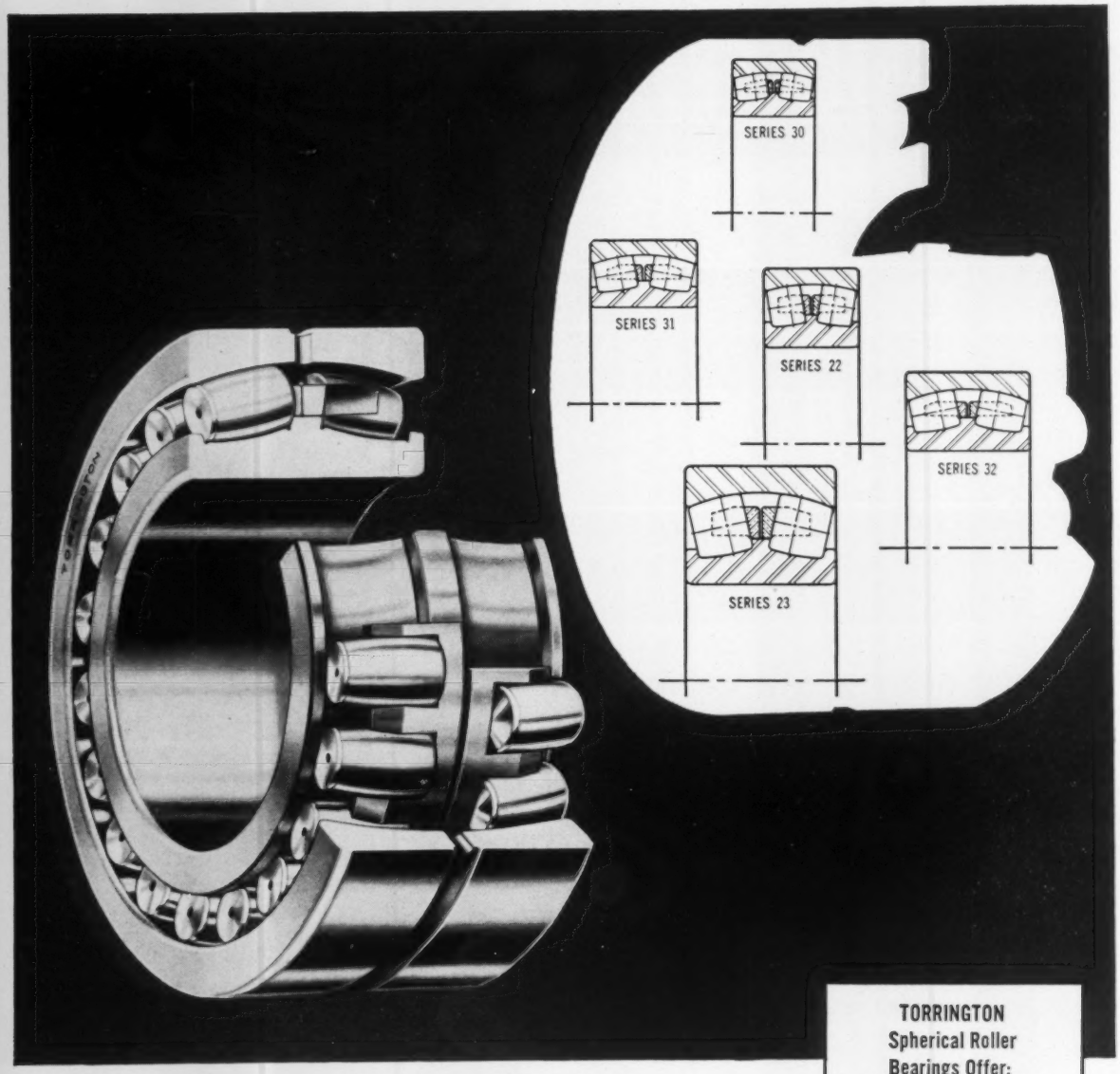
Made from Jalcase 100, these armature shafts are used in Black & Decker's ¼" Portable Electric Utility Drill.



▲ Black & Decker hobs pinion gears made of Jalcase 100 to tolerances of less than .001".

◀ Palletized trays transport a few of the many B&D machined parts that are made from J&L bar stock.

J&L STEEL



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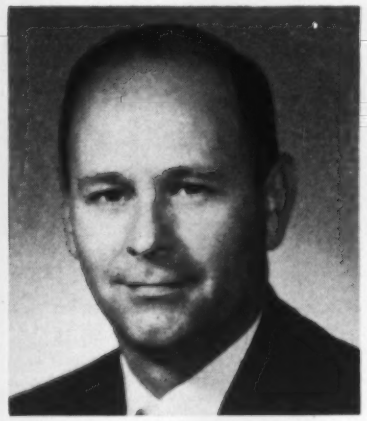
(Continued from P. 96)

A. G. Richards, appointed field engineer, honing stone sales and services.

R. F. Anderson, appointed manager, domestic sales, The M. A. Hanna Co.



D. R. Beard, appointed district sales manager, Philadelphia office, Wheeling Steel Corp.

OBITUARIES

L. H. Norton, 72, treasurer and director, Oglebay Norton Co., Cleveland.

R. R. Saunders, 61, hot strip mill superintendent, Empire-Reeves Steel Corp.

E. J. McDonnell, former vice president, steel plant equipment sales, Equipment Div., Blaw-Knox Co., Pittsburgh.

W. S. Jack, 71, founder and head, Jack & Heintz, Inc.

A. S. Blagden, chairman of the board, The Federal Machine & Welder Co., Warren, O.

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Pittsburgh Metals Purifying Co.
MARS, PENNSYLVANIA

. . . Stacks of Nestaway racks show nesting, interlocking and space-saving features of racks for baked goods handling made by Mid-West Metallic Products for its affiliate, Nestaway, Inc. Rack held by Harold W. Vetter (left), Mid-West director of manufacturing, and Robert J. Adams, purchasing agent, holds 12 loaves of bread and stacks 12 high on castered base. Rack uses up to 13.3 pounds of Pittsburgh Steel Co.'s bright basic wire.

DELIVERING BREAD—BY WIRE

Pittsburgh Steel wire's uniform welding, forming properties give Mid-West Metallic extraordinary success in the manufacture of Nestaway racks

Bread and pastries are delivered better by wire. That is, by welded steel wire racks that perform double duty in handling and selling baked goods.

Mid-West Metallic Products, Inc., a fast-growing subsidiary of Rubbermaid, Inc., uses Pittsburgh Steel Company's bright basic wire to build wire shipping racks for its affiliate, Nestaway, Inc., another Rubbermaid subsidiary. In addition to the Nestaway racks, Mid-West makes more than 300 other wire formed products, using Pittsburgh Steel's bright basic and galvanized wire in a wide range of sizes.

The Nestaway racks, however, are a prime example of Mid-West's experience in using Pittsburgh Steel's .3625 and .3065 bright basic wire.

The racks are part of a complete Nestaway system for baked goods handling to and at the point of sale. The system includes interlocking wire racks, rack shelves and caster bases. It eliminates nearly all direct handling of baked goods between bakery and consumer.

To build the Nestaway racks, Mid-West uses automated and semi-automated forming and welding equipment of its own design. This equipment requires wire with the highest possible uniform physical properties. Mid-West depends on Pittsburgh Steel for much of its wire supply because it is assured consistent, uniform quality.

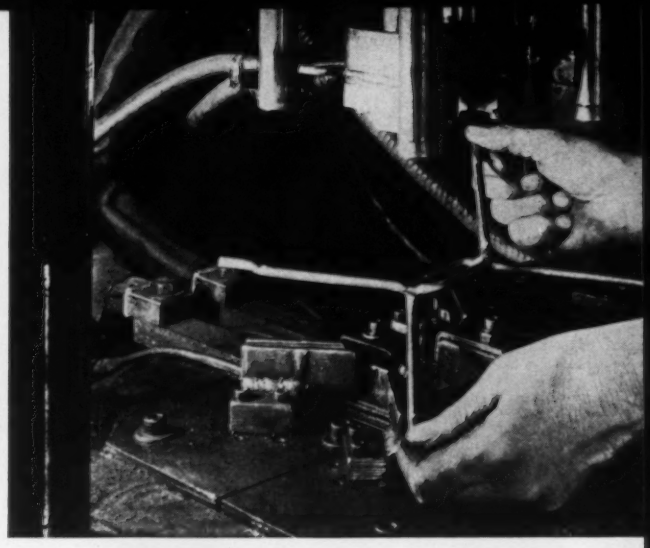
• **Phenomenal Welding Success** —Made in 11 sizes ranging from 8.4 to 13.3 pounds in weight, an average Nestaway rack requires 200 welds.

On welding, Harold W. Vetter, Mid-West's director of manufacturing, says:

"In all of our production last year, we had an extraordinarily low number of broken welds. We've had racks returned that had been accidentally crushed by trucks—but the welds were seldom broken."

Purchasing Agent Robert J. Adams adds further evidence of the

. . . From straightening and cutting through final copper-nickel-hard chrome plating, Pittsburgh Steel's wire meets Mid-West Metallic's requirements for consistent uniformity of forming, welding, coating properties.



. . . Key piece of rugged Nestaway rack—the bends and welds on "X"-shaped side supports are produced to tolerances of plus/minus .015 inch by Mid-West Metallic with Pittsburgh Steel's .3625 bright basic wire.

weldability of Pittsburgh Steel's bright basic wire, saying:

"We found Pittsburgh Steel wire would consistently hold welds when we bend the welded ends of the rack's bottom frame to form Nestaway's interlocking feature."

• **Close Forming Tolerances**—Because Nestaway racks are built to stack when loaded and nest precisely when empty, wire bends are made to unusually close tolerances. Mr. Vetter explains:

"This rack is so accurately formed that it's practically a machined product. Every bend—even over-all dimensions and some welds—is held to a tolerance of .015 inch."

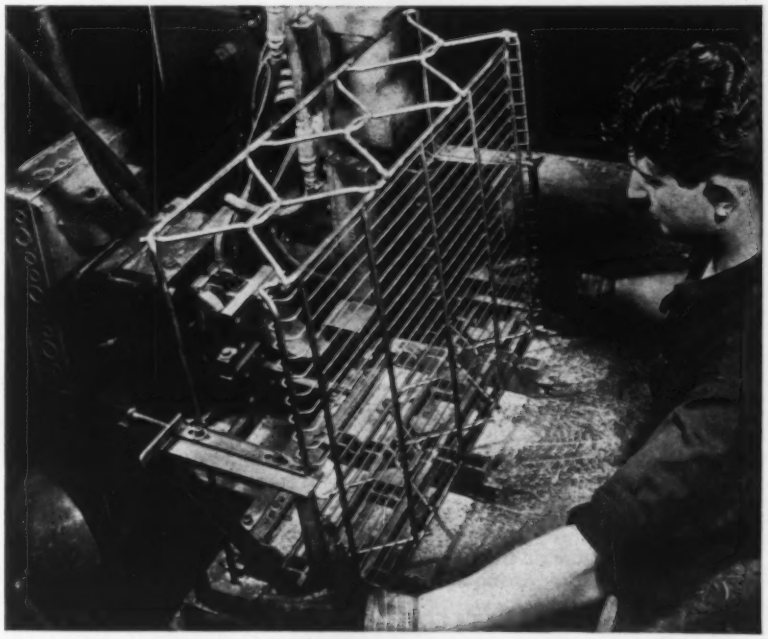
Surface finish of Pittsburgh Steel's wire is vital, too. After assembly, the rack is given a copper-nickel-hard chrome coating to provide a durable, attractive unit which meets strict standards of cleanliness.

Pittsburgh Steel's ability to supply wire with the consistent quality Mid-West Metallic requires is testified to by Purchasing Agent Adams. He says:

"Pittsburgh Steel furnishes us quality wire with uniform properties from shipment to shipment. Otherwise, we're in trouble on our automatic machines. We want wire that is weldable, formable and clean.

"Pittsburgh Steel has been able to give us what we want with consistency and we're extremely satisfied with the way its wire performs for us."

Take a lesson from Mid-West Metallic's experience. The benefits this progressive company gets from using Pittsburgh Steel's wire can be yours, too, whatever your application. Just contact one of the district offices listed at the right.



. . . With 200 welds per rack and a present capacity of more than 25,000 Nestaway racks per month plus component parts of the Nestaway System, Mid-West Metallic experiences very few broken welds in the course of a year. Credit goes to efficient equipment and wire quality. Nestaway rack is shown here in assembly before chrome plating. Mid-West, a subsidiary of Rubbermaid, Inc., looks to Pittsburgh Steel for bright basic wire and plain galvanized wire to make Nestaway racks and more than 300 other products at the new Cleveland, Ohio, plant.

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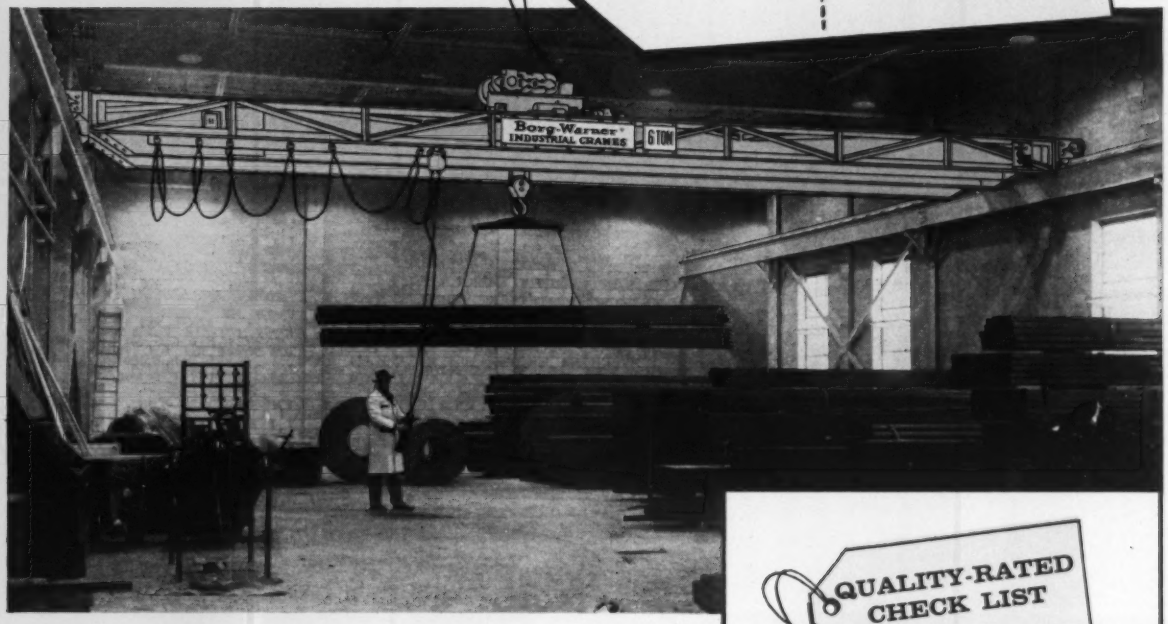

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FAST DRILLING: Tape controls save one hour in drilling and 30 minutes in set-up times on cast iron part.

Tape-Controlled Radial Drill Handles Small-Lot Jobs

By **J. Stevenson**—Plant Ind. Engr., Food Machinery & Chemical Corp., Hoopeston, Ill.

Machining with tape controls is fast and accurate. But is it useful in plants that have a variety of short runs?

Take a look at these results and judge for yourself.

▪ When you're faced with the problem of machining a variety of metal parts—in both short and fairly long runs—a great deal of set-up and machining time is required.

The jobs can be done, it's true. But standard methods don't always result in the desired accuracy. Nor do they come up with the speeds needed to satisfy production demands.

At the Canning Machinery Div. of Food Machinery and Chemical Corp., Hoopeston, Ill., a large number of precision machines are made. And each one of these machines has as many versions as there are can sizes. So many, in fact, that this plant makes 35,000 different parts; 50 basic lines of machines; and 250 basic machines.

Heavy Investment — You can imagine the sums of money invested to produce holes in many of the parts that are made in small lots. To wipe out these expenditures, a tape-controlled positioning table and radial drill was purchased. The equipment is manufactured by The American Tool Works Co., Cincinnati.

Before the new unit went into service, placement of machined holes left much to be desired, even though they were produced by drill jigs and piloted boring bars, horizontal boring mills, vertical mills and jig borers. As a result, each hole merely became a compromise between accuracy and cost.

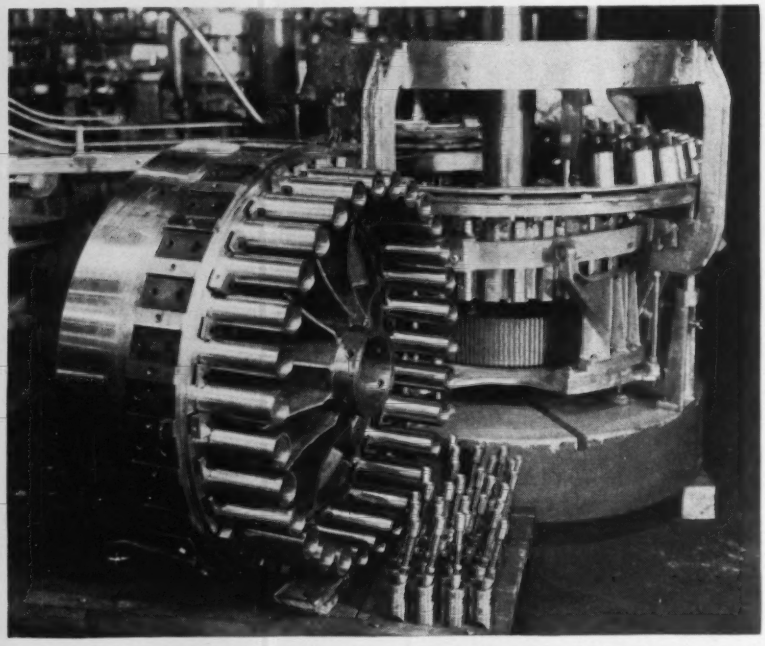
The tape-controlled unit satisfies two main needs. First, it places holes accurately and quickly. And second, it provides both of these functions with a minimum of tool cost.

The Right Machine—The search for the right machine led engineering personnel into six companies where demonstrations were performed. But company requirements remained stringent. It had to be a

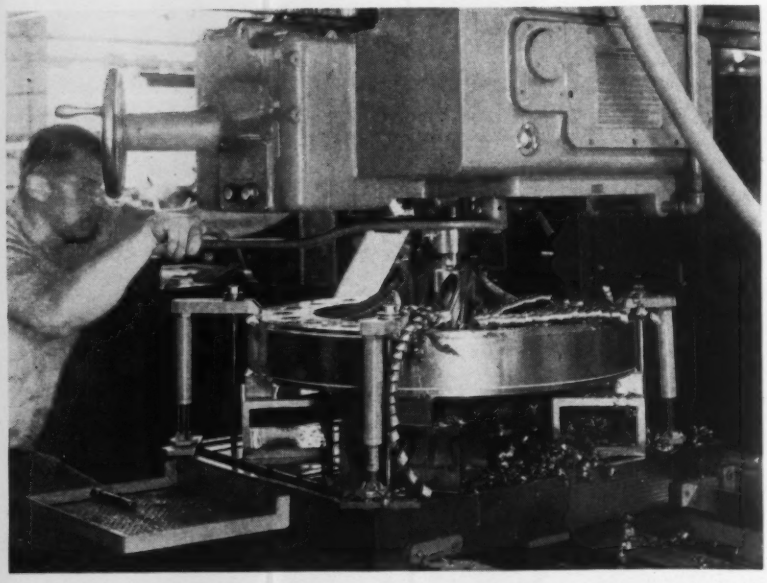
machine that would place holes near the accuracy of a jig borer. This had to be done with the speed of a radial drill and the rigidity of a milling machine.

In this case, American Tool Works had the machine to do the job. This unit is rugged, accurate, fast and simple to operate. Workers at the plant are particularly pleased with five main features of the machine.

Number One—First on the "appeal" list is the block reader. The needed data for one position are read at one time and the machine responds instantaneously. This block reading reduces the size of the control equipment and number of components. How? There are no information storage circuits.



STAINLESS CASTING: Total savings accrued in machining stainless casting amount to four hours per piece plus three hours in set-up time.



WITH PRECISION: Tape controls help core drill, rough bore and finish bore 20 deep holes, plus drilling and tapping 60 other holes.

Engineers at the plant expect that maintenance and downtime will be directly proportional to the number of components. The block reader also gives the operator the opportunity to withdraw and return the table from under the spindle to check a hole size. All he has to do is press a button. No need to back up the tape or dial in some number.

The very design of the table is another feature. It has a vee and flat way. There are no gibs or clamping devices. The hydraulic cylinder actuation gives a maintenance-free, rigid, accurate positioning table.

Easy to Learn—A third area of profit is the machine's base of operation. The methods engineers and operators have no trouble in mastering this latest advance in metalworking. The company foresaw the gain in direct costs with hardly any increase in indirect costs.

Food Machinery could have gone to a more sophisticated machine. But management knew that such a move would place the company in the area of diminishing returns. In other words, the indirect costs to support such a unit would rise rapidly while the direct costs would decrease very slowly.

Good Spindle — The spindle is excellent, too. Proof? Operators have bored out to the size of the spindle in stainless steel with heavy feeds and speeds without any trouble.

A final advantage is apparent in the Farrand measuring scales. In the opinion of company personnel, there's no finer way to measure the table displacement. No wear parts and totally enclosed, too.

It takes more than a piece of new equipment to make production gains. At Food Machinery and

Chemical, all the workers involved in the unit were trained accordingly. The company explained the operation of the new machine. And each worker was briefed on his role in tape control.

The effect was rewarding. The support was enthusiastic. And the company was able to draw from the valuable machining experience of a group of able men. As a result, there was little delay from the time the machine arrived at the receiving dock until the time it actually went into service.

Holes are now being placed near the accuracy of a jig borer at 41 pct of the former cost. Look at the savings accrued in the recent manufacture of a new machine. On just nine parts, $2975 was saved in tooling alone. Also, the design engineer can get exactly what he wants.

Test Yourself—Put yourself in the driver's seat of management. Suppose you are confronted with selecting one out of three procedures that have been processed by your methods department. Each drawing represents a new 15-pocket filler. Nine of these parts could be made in one of three ways.

You can make $2930 worth of tools. Then produce the parts in 250 hours per year. Your next choice: Make no tools, but produce the parts in 1150 hours per year by conventional machines. Finally, you can use the tape-controlled machine. Here, of course, no tools are required. And you can produce the parts in 125 hours.

Actual Decision — These same alternatives were presented to Food Machinery and Chemical. The second method was turned down. It was too costly. Tape controls won out hands down. The reason? The company just couldn't afford the high tooling cost involved in the first choice—$2930.

Savings in assembly costs was apparent on the first part that was machined—a can collecting plate. From the start, tape controls effected a four-hour saving in assembly labor per machine. By including 20 machines per year, the annual savings will soar to 80 hours. To date, no parts have been scrapped. Nor has any re-work been done.

How Tape Controls Cut Costs

MACHINED PART	YEARLY OUTPUT In Pieces	YEARLY OUTPUT In Orders	PRODUCTION BY PREVIOUS METHODS Set-up Time, Hours	Length of Run, Hours	Machining Required	Hours Per Year
Guide for Nozzle Plunger	200	2	0.75	0.3	Box drill jig	60.9
Bottom Plate	4	2	2.5	0.868	Four operations drill jigs and mill	6.73
Filling Hopper Bottom (9 cylinder)	7	5	6.0	3.3	Vertical mill	36.6
Chain Case	15	3	1.8	0.68	Boring mill, layout, drill	13.6
Lower Measuring Cup	4	3	3.0	1.3	Vertical mill	10.3
Main Supporting Ring	10	2	5.25	2.5	Vertical mill and radial drill	30.5
Filling Hopper Bottom (10 cylinder)	16	5	5.3	2.5	Vertical mill	54.0
Filling Hopper Bottom (15 cylinder)	8	3	6.9	3.9	Vertical mill and radial drill	40.2
Connecting Ring	3	2	4.5	2.5	Vertical mill	11.5
Main Frame (right and left hand)	40	3	10.8	1.41	Layout, punch drill	84.6
						348.9 hours

MACHINED PART	TAPE-CONTROLLED METHOD Set-up Time, Hours	Length of Run, Hours	Hours per Year	TAPE-CONTROLLED SAVINGS In Hours	By Pct
Guide for Nozzle Plunger	0.75	0.062	13.8	47.1	77.4
Bottom Plate	1.5	0.53	4.1	2.63	38.8
Filling Hopper Bottom (9 cylinder)	3.0	2.0	19.0	17.6	51.9
Chain Case	0.75	0.23	4.01	9.6	60.5
Lower Measuring Cup	1.5	0.75	5.25	5.0	49.0
Main Supporting Ring	2.0	1.5	16.0	14.5	47.4
Filling Hopper Bottom (10 cylinder)	2.5	2.0	34.5	19.5	76.8
Filling Hopper Bottom (15 cylinder)	3.4	2.6	23.2	17.0	42.5
Connecting Ring	0.75	0.5	2.0	9.5	82.8
Main Frame (right and left hand)	1.4	0.5	22.7	61.9	73.2
			144.6 hours	**204.3 hours**	**58.5 pct**

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

New Furnace Permits Recovery Of Reactive Metal Scrap

Melting of titanium scrap and casting into usable ingots can be difficult, costly, and sometimes dangerous.

Here's how a new furnace solves this problem.

■ A new vacuum melting furnace, primarily intended for titanium scrap recovery, combines the unique features of skull melting by permanent electrode with vacuum melting by consumable electrode.

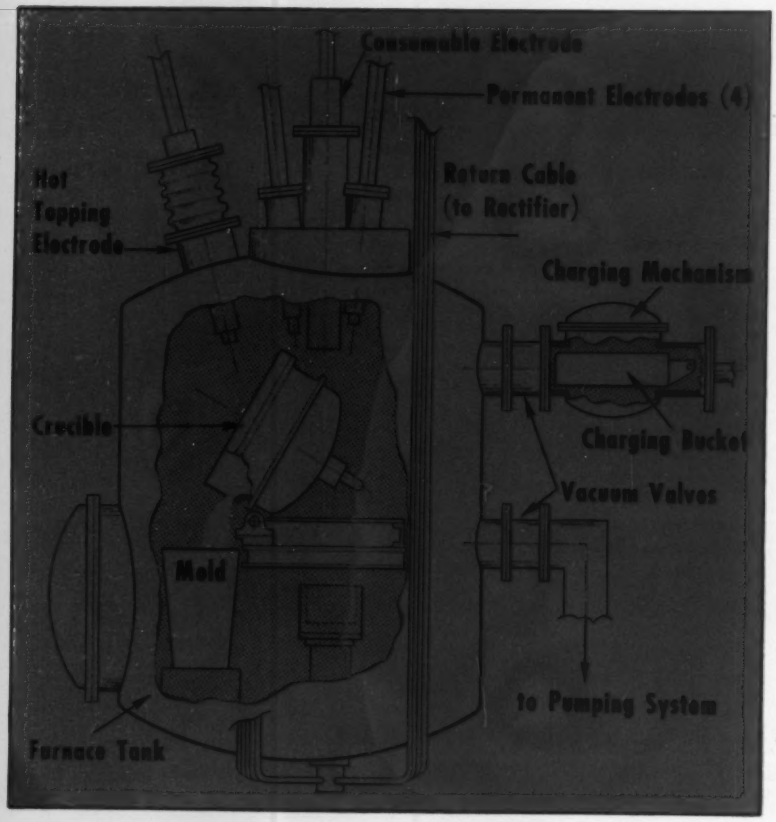
Principal aim of the designers was a furnace with improved operating safety for melting and casting highly reactive metals. It was developed by the National Research Corp., Cambridge, Mass., under contract for the General Services Administration.

Design Proves Out — After ten successful pours, the furnace proves out some unusual design features. These include its helium-gas cooling system which replaces the standard water-cooling system. One reason for using the new cooling system is that titanium, like other reactive metals, reacts explosively with water or water vapor in the event of a mechanical failure.

Single pours of titanium up to 400 pounds have been made. It's expected that 800-lb pours can also be achieved with this unit. The same general equipment design can also be used for building larger furnaces for commercial applications.

Another advantage of the process, inherent in skull melting but not with cold mold techniques, is the ability to pour from the "skull" into either ingot or shape castings.

Here's How Casting Is Made



BEFORE POURING: Furnace operator checks titanium melt. A fifth tungsten electrode permits him to melt solid metal in lip before pouring.

Forms a "Skull"—Here's how the furnace operates. The 34-in. diam by 21-in. deep stainless steel crucible is loaded with scrap titanium or other metals. After evacuating and back-filling with argon, a "skull" or protective layer of the metal forms on the inside surface of the crucible.

More scrap is loaded in 50-100 lb lots through a charging unit, which can also be evacuated and argon filled. Thus, the added scrap discharges into the crucible during the argon-filled portion of the melting cycle.

The crucible can hold about 2300 pounds of titanium, of which 500-1000 pounds can be melted. Ultimate capacity depends upon required skull thickness of solid titanium.

To Remove Hydrogen—After all the scrap charge has been loaded and melted under argon by four permanent thoriated - tungsten electrodes, the furnace is evacuated to remove hydrogen from the final product.

Since tungsten electrodes operated under vacuum tend to erode, a 9-in. diam consumable electrode made of titanium is provided at the crucible center. Actually, it contributes ten pct or less to the total melt.

The consumable arc vacuum melting step is strictly for beneficiation of the metal by removal of hydrogen and other dissolved gases which do not form stable compounds with the metal.

Ingots Are Homogeneous — According to National Research Corporation, skull melting allows greater homogeneity in alloying than cold mold consumable electrode arc methods. Reason: the entire mass of metal to be poured is kept molten. This permits stirring action to occur, and gives homogeneous ingots in a single melting operation. When using straight consumable arc techniques, a second melting is often needed.

A fifth permanent tungsten electrode which is controlled by the furnace operator in both vertical and horizontal directions melts the solid metal in the lip of the crucible just before pouring. It is also used for hot-topping the ingot or shape casting, and has been very effective in filling shrinkage cavities.

An ultimate vacuum of one micron can be obtained with the new furnace. Overall cycle time, including pump down, takes 75-90 minutes for a single 400-500 lb pour. Larger pours require somewhat longer cycle times.

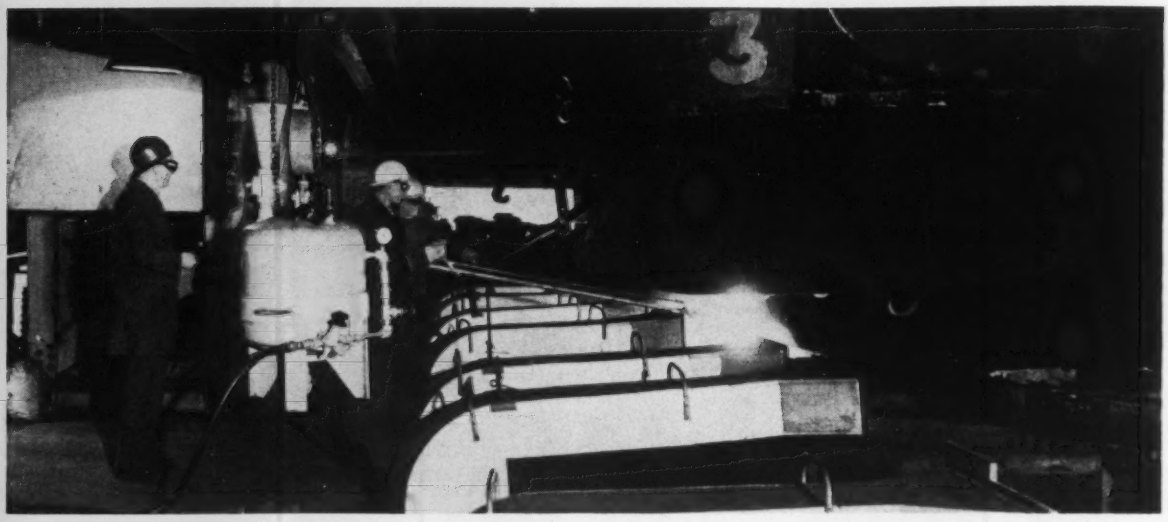
For Centrifugal Casting — Proposed for future research using the new furnace are systems for centrifugal casting of rare and refractory metals. Either a vertical or horizontal casting machine using an outgassed graphite mold will be used.

The outside contour could be reproduced with high fidelity, company engineers believe. The inside diameter could be controlled within reasonable limits by using special apparatus for controlling the weight of the pour.

It is believed that vertical castings with typical dimensions up to 2½-ft diam by 1½-ft high with 3½-in. average wall thickness could be produced. Horizontal castings up to 5½-ft long are possible using external equipment coupled to the furnace at the present door flange.

COMBINES FEATURES: New furnace combines features of permanent electrode and consumable electrode melting to recover titanium scrap.

MELTED FROM SCRAP: J. L. Ham and W. H. Keller of National Research Corporation, Cambridge, Mass. inspect a 300-lb titanium ingot melted from scrap metal and cast in new helium-cooled furnace.



HOT AND HEAVY: As leaded steel pours into molds, fumes are withdrawn through a duct on top of each mold. This prevents contamination of the atmosphere. It also insures safe working conditions.

New Developments Boost Quality Of Acid-Bessemer Steels

By **A. B. Wilder**—Chief Metallurgist, National Tube Div., U. S. Steel Corp., Pittsburgh.

Since 1861, U. S. steelmakers have employed the acid process in bottom-blown convertors.

This process is constantly being improved. Result: Increased production efficiency and higher quality steels.

■ A lot of attention centers on instrumentation for end-point control in acid-Bessemer steelmaking. Photocells and the spectograph are often used. But, acid convertors are still normally turned down at the end of a blow after visual checks on the flame.

In making duplex steel, the convertor is turned down when the carbon content is 1.5 to 2.0 pct. This takes place at the end of the silicon blow. Blown metal of this type provides a low nitrogen content.

The convertor may also be turned down for duplex steel at the first change in the flame (0.1-pct carbon) —instead of the usual second change at 0.04-pct carbon.

Other instruments which indicate the volume and pressure of air serve in the Bessemer pulpits. Complex

Check Chemical Compositions

	Taconite, pct			Bessemer, pct		
	Concentrate	Iron	Slag	Ore	Iron	Slag
Moisture	1.73	.....	.....	5.65	.....	.....
Silica	7.56	.....	39.24	8.28	.....	38.18
Silicon	.....	1.45	.....	.....	1.52	.....
Iron	62.51	.....	0.19	56.48	.....	0.21
Manganese	0.23	0.312	0.23	0.14	0.391	.024
Phosphorus	0.017	0.033	.....	0.033	0.059	.....
Alumina	0.25	.....	7.74	0.38	.....	8.91
Lime	1.57	.....	42.12	0.37	.....	42.33
Magnesia	0.63	.....	9.70	0.28	.....	9.34
Sulphur	0.015	0.022	1.30	0.011	0.024	1.32

instrumentation also provides other control data. These data feed into recording devices.

Convertor Fume—There are two theories to explain the cause of iron - oxide fume formation. The iron-vaporization theory is based on the exothermic reaction of oxygen and iron. High temperatures develop with vaporization of the iron in the area of the reaction.

These vapors disperse in the nitrogen or carbon monoxide gases. The gases reach the air and oxidize the iron to form brown fume.

Introduction of steam with air for bottom blowing reduces oxygen's high-reaction temperature with iron. This is due to the endothermic nature of decomposition of steam into hydrogen and oxygen. In part, this may be the reason for the reduction of brown fume in steam - oxygen, bottom-blowing practices.

Another Theory — An iron - carbonyl theory has also been proposed. This theory provides for the reaction of CO from the bath with iron carbide to form iron carbonyl.

After the formation of this compound, it dissociates into iron and CO. The iron becomes oxidized to form brown fume.

At the end of the blow, the carbon content is very low. Therefore, the latter theory doesn't account for the dense brown fume at the end of each blow.

Fume from a bottom-blown acid convertor is mainly iron oxide. Less than 10-pct $Si0_2$, $Mn0_2$, AL_20_3, Ca0 and other oxides are present. In the bottom-blown basic convertor, 50 pct of the solids in the fume may be oxides other than iron. Particle size of fume from bottom-blown convertors is about 0.1 to 5.0 microns.

Variable Dust—The amount of dust varies. From 1 to 3 grains per cu ft have been reported. Injection of steam into the waste-gas stack makes the gas lighter in color. But the amount of solid matter doesn't change.

Wet mechanical - washing processes or dry-electrostatic precipitation provide for cooling of the gases. They also collect fumes.

For bottom - blown convertors, there's no reliable method for dust removal. The problem centers on blowing through the bottom while the convertor turns from the horizontal into the vertical position or vice versa. This produces fumes by side blowing which can not be collected in the type of hood used for top blowing.

Nitrogen Problem — In bottom-blown vessels the volume of gases is large. This is due to nitrogen in the air. The gas volume has to be reduced for economic reasons if the bottom-blown process hopes to compete in fume control with other steelmaking methods.

Use of waste-heat boilers provides a means of cutting the fume control costs in the top-blown vessels. But these boilers aren't practical for bottom-blown vessels.

Taconite concentrate aids in the production of low phosphorus steel for seamless pipe. Chemical composition of taconite concentrate used for burdening a blast furnace and the iron produced appear in table form.

Low Phosphorus Steel — Acid-Bessemer steel produced from low phosphorus iron has gone into the production of seamless pipe to ASTM specifications A53 and A120

HOT PIERCING: The Mannesmann process is employed to hot pierce an acid-Bessemer solid steel into seamless pipe. Output rate is high.

—and API spec 5A, 5L and 5LX. Chemical composition and tensile properties of this seamless pipe appear in another table.

Ingot to pipe yield increases 4 pct with the low phosphorus Bessemer steel. This increase in yield is a result of less seaminess in the pipe.

The steel is deoxidized in the ladle with aluminum for nitrogen fixation. This produces a thoroughly killed steel.

Strength properties can be increased with higher carbon or manganese. An increase in carbon or manganese, equal to the change in phosphorus, doesn't alter the weldability of the steel.

Phosphorus is often associated with brittleness in steel. But in the steels listed in the second table, there's no data to support this conclusion.

Combination with Nitrogen—It is possible that brittleness—which has been associated with phosphorus in Bessemer steels—is actually caused by nitrogen. Steel properly deoxidized with aluminum will fix the nitrogen.

Carbon and phosphorus raise the Charpy impact transition temperature of steel. Maganese lowers this temperature. In API spec 5LX, the carbon content of the Bessemer seamless pipe is 0.05 pct lower than openhearth seamless pipe. This is due to 0.05 pct higher phosphorus content of the Bessemer seamless pipe.

Many standard AISI steels may be treated with sulphur and/or lead to improve machinability. These steels provide high output rates and reduce tool costs for machined parts.

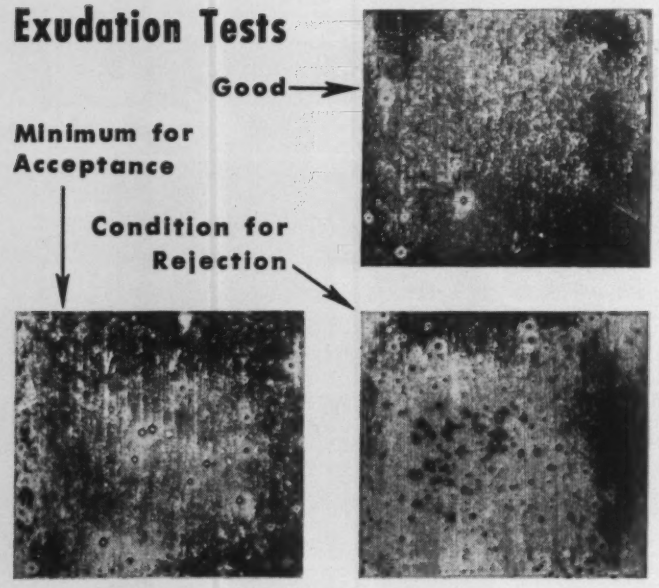
In making these steels, it's necessary to maintain a low silicon content. And all aluminum must be eliminated. Silicate and alumina inclusions reduce machinability.

Free - Machining Steels — Resulphurized steels at the Lorain Works of the National Tube Div. are produced in 32-in. square, 10-ton ingot molds. Normally, acid - Bessemer free-machining steel contains 0.015-pct nitrogen. If a lower nitrogen content (0.008-pct N) is desired, the iron is side blown into the convertor.

Most of the leaded steels produced at the Lorain Works contain 0.15- to 0.35-pct lead. They require about 7 lb of lead per ton of steel. Each storage tank is weighed before and after a heat is poured. This determines the exact amount of lead used.

A fume exhaust system connects to hoods on the top of each mold. The addition of lead is controlled with a stop watch. Pouring time for each ingot, time of addition and air pressure in the lead storage tank are carefully controlled.

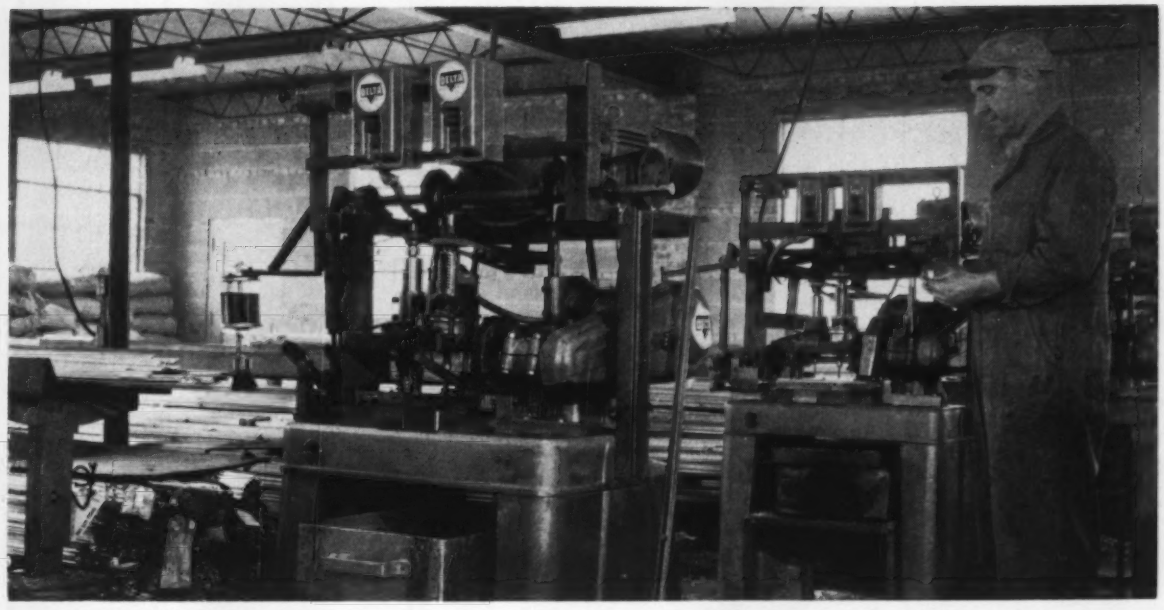
As a heat of six 10-ton ingots is poured, there are predetermined changes in head pressure in the ladle and nozzle wear. These changes control the rate of teeming. Storage tank pressure and addition time varies to suit these changes. This provides the correct amount of lead in the steel.



SWEAT TEST: Tests disclose various degrees of lead distribution.

Here's General Qualities

	8⅝ in. OD x 0.322-in. wall ASTM A53, Grade B		2⅜ in. OD x 0.190-in. wall API 5A, Grade J	
	Taconite	Regular	Taconite	Regular
Carbon, pct	0.15	0.15	0.41	0.40
Manganese, pct	0.58	0.50	0.98	0.90
Phosphorus, pct	0.035	0.063	0.039	0.063
Sulphur, pct	0.027	0.025	0.023	0.022
Yield, psi	45,490	46,488	64,560	63,521
Ultimate, psi	64,892	67,376	100,259	98,520
Elongation, pct in 2 in.	41.0	40.4	40.4	40.9



OPERATES ITSELF—Drill, tap and cut on one automated unit. Forty pieces per minute are processed from a 24 ft extrusion. Production costs are reduced 87 pct by stacking the operations.

Automating the Small Tools Slices Production Costs

Are separately operated drills, taps and cut-off machines pulling down your profits?

If so, here's how you can combine the operations into a single automated process.

■ By automating the smaller industrial tools, greater profits can be realized. Drain Enterprises, Addison Ill., has completely mechanized the production of drilled and tapped sink frame lugs.

A drill press, tapping unit and cut-off machine are combined to form one automated machine. Less floor space is needed, so additional units are installed to increase output.

Two men tending five machines produce as much as 15 units formerly put out with individually operated tools. This reduced production costs 87 pct. Each machine drills, taps and cuts 40 pieces per minute from a 24-ft extrusion.

How It Works—The three-step operation is made by installing two drill press spindles on a cut-off machine table. A motor-driven cam feed and actuating system is added to mechanize the unit.

The two drill press spindles are installed on the top of a regular die set block with springs to return spindles after each operation. The tapping spindle is on a spring floating mount which facilitates entrance of the tap in the drilled hole.

There is also a spring to return the cut-off machine arm. The feed mechanism advances the extrusion to a stop at the beginning of each cycle. The cam shaft, driven by a motor reduced to 30 rpm, is mounted over the tools in an angle iron frame.

The first cam actuates the feed device, the second the drill press spindles, and the third the cut-off machine. The finished part drops through the table into a box below.

Dual Drive — One motor, mounted behind the tools, drives both spindles from a two-step pulley. The drilling spindle is run from the larger pulley and the tapping spindle from the smaller pulley to obtain a slower speed.

Precision operation depends upon feeding stock against the positive stop. This is accomplished by using precise extrusions. Tension of the feed cam against the stock is adjusted to account for irregular dimensions in the extrusions.

Cams are changed for various size extrusions. The blade size in the cut-off unit may also be changed as required.

Large Single Crystals Provide Ultra-Pure Refractory Metal

Refractory metals have great industrial potential. But this potential hasn't been realized.

Single crystals may be the answer. They are formed and worked at heats much lower than the normal refractory group.

▪ Refractory metals and metallic compounds are now being grown in the form of large single crystals. Individual crystals up to 1-in. diam by 12-in. long are being made.

A new, arc-fusion, crystal-growing process produces the huge crystals. These crystals include refractory metals such as: tungsten, molybdenum, tantalum, columbium and vanadium.

Also available in large single crystals are several compounds. These compounds include: titanium carbide, titanium diboride, columbium carbide, molybdenum disilicide, titanium monoxide and titanium sesquioxide.

Cylindrical Shapes—All crystals are made as cylinders. Diameters range from ¼ to 1 in. Lengths extend from a few inches to over a foot. Larger crystals and other shapes will be made as the need develops.

The crystal-growing process resembles the Verneuil flame-fusion process which is used to make synthetic sapphire, star sapphire, rutile and other crystals. A major advantage of the Verneuil process is retained: No container is needed for the molten substance.

The new process—further details of which are being withheld—is a development of the Linde Co., a div. of Union Carbide Corp., Indianapolis.

Dr. G. H. Wagner, Linde's Director of Research, states: "Through research we have been able to remove a serious limitation on progress in the science and technology of high temperature materials. As has been pointed out by the National Academy of Sciences and other government agencies, the lack of availability of single crystals has handicapped the nation's research in high temperature materials.

Easily Fabricated — All of the large single crystals preserve the standard melting points of the refractory metals. And they provide an ease of fabrication heretofore unknown.

To illustrate the advantages of the new class of metals, Dr. Wagner points out that tungsten—made by powder metallurgy or arc melting—is normally heated to about 2000°F before it can be worked.

By contrast, single crystal tungsten can be worked at much lower temperatures. A bolt made of this material has been threaded at room temperature without cracking.

Many Uses—Large single crystals will prove important in many areas. Notable uses include elec-

Crystals Have Good Properties

Material	Formula	Crystal Structure	Melting Point, °C	Vicker's Hardness, 300 gm	Theoretical Density, gms/cm³
Tungsten	W	Body Centered Cubic	3370	67	19.259
Molybdenum	Mo	Body Centered Cubic	2625	192	10.2
Vanadium	V	Body Centered Cubic	1735	189	6.0
Columbium	Cb	Body Centered Cubic	2415	107	8.57
Tantalum	Ta	Body Centered Cubic	2996	119	16.6
Titanium Monoxide	$TiO_{1.19}$	NaCl Cubic	about 1760	1406	Unknown
Titanium Sesquioxide	Ti_2O_3	Trigonal (Corundum)	Unknown	1351	Unknown
Titanium Carbide	$TiC_{0.94}$ (19-pct C)	NaCl cubic	3250	3230	4.93
Molybdenum Disilicide	$MoSi_2$	Tetragonal	2030	1097	6.24

tronics and astronautics — where high heats, wear and corrosion are design problems.

Regular refractory metals have long been recognized as having a great potential for industrial purposes as well as space-age needs. However this potential hasn't been realized. This is true despite the amount of research expended.

There are many reasons why the regular refractory metals haven't lived up to expectations. Why? The regular refractory metals have low ductility and are difficult to form. They also contain impurities such as oxide inclusions.

The breakthrough achieved by Linde will improve industry's ability to use both refractory metals and compounds.

Better Structure — Check the long-standing problems one by one. Ductility of the Linde single crystal metals is much better than those that have a polycrystalline structure.

Single crystals contain very small amounts of impurities. This reduces brittleness caused by oxide inclusions.

And here's the most important factor. Single crystals can be formed and worked at temperatures much lower than those needed to work the normal refractory group.

All the new materials lend themselves to standard metalworking processes. They can even be swaged —making allowances, of course, for differences between the various metals and compounds involved.

Crystals come in "as-grown" cylindrical forms. They can also be purchased as swaged or fabricated shapes. Linde engineers are working on new compounds. The result will be even larger shapes than those now being produced.

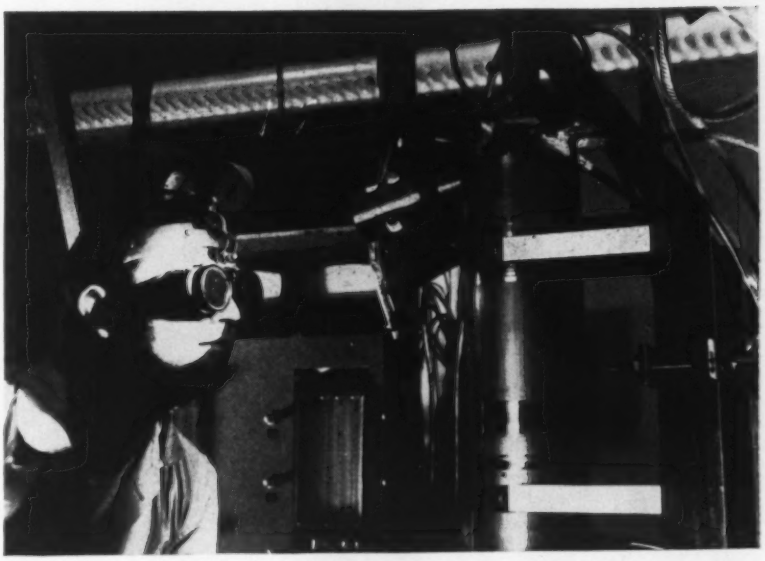
Special Applications — High purity and non-porosity of tungsten crystals suggests applications as electrical contact points in vacuum switches, lead-ins to vacuum equipment, and other uses where outgassing is a problem.

High purity of these crystals also results in low cold emission. This makes the new tungsten crystals suitable for quite a few electronic parts.

Some of the non-metal crystals hold promise as semiconductors. Titanium diboride, for instance, proves itself as a high temperature semiconductor. It combines conductivity with hardness and corrosion resistance.

Because single crystal tungsten can be worked at much lower temperatures than the sintered, swaged, or arc-cast metal, it's suitable for the fabrication of wire, rod, sheet and other wrought products.

The new materials lend themselves to the solution of many problems in high temperature electronics. Their ability to meet wear, corrosion and high heats are prime factors in design analysis.



HUGE CRYSTALS: Crystals are made in diameters ranging from ¼ to 1 in. Lengths extend from a few inches to more than a foot.

Compare Single Crystal Sizes

	Material	Largest Diameter, in.	Maximum Length, in.
METALS	Tungsten	⅝	12
	Molybdenum	¾	12
	Vanadium	¾	12
	Columbium	¾	12
	Tantalum	⅝	12
COMPOUNDS	Titanium Monoxide	⅜	2
	Titanium Sesquioxide	¼	½
	Titanium Carbide	⅜	¾
	Molybdenum Disilicide	¼	½

Flattening Mill Accents Speed

High-Carbon Strip Steel Is Tailored to Customer Needs

With the demand for speciality steels to double in 10 years, producers are streamlining their mills.

Your special needs have been anticipated. Here's a rundown on what to expect.

▪ High-carbon steel strip is in demand now, more than ever before. Its many uses include spring steel for textile machines, automatic valve and trunk lid springs and hand-powered saw blades.

To meet these demands, and at the same time recapture some of the domestic market that has been lost to foreign producers, Athenia Steel Div., National-Standard Co., Clifton, N. J., has installed one of the worlds fastest wire flattening mills.

Up to now, foreign producers have been able to cope with the demands for steel strip. With the increased market, new methods are sought to produce coils faster and more economically.

Terriffic Speed — To do this Athenia's engineers called on Waterbury Farrel Foundry & Machine Co. to build their strip mill. The unit has a top speed of 3300 fpm and holds tolerances within 0.002 in. on widths and 0.00025 in. on thicknesses of finished products.

The high speed of the mill is combined with large reel capacities.

Special cooling equipment, included with the mill, cools the steel and preserves its condition for further working. This is an asset to the user.

Variety In Sizes—The mill is capable of running flat steel from 16 in. widths and 0.072 in. thicknesses to ¼ in. widths and 0.001 in. thicknesses in coils up to 5000 lbs.

Flattened round wire is run from ½ in. wide and 0.065 thick to 0.010 in. wide and 0.001 in thick. These are run in coils up to 1000 lb. The mill is designed to offer a wide variety of finishes to meet the specifications of such units as business machines and computers.

Proper Layout — The engineers designed the facility around three principles to make production more economical. Equipment has been integrated to handle large and standard coils of both round and flat stock. This cuts down handling for each ton produced.

Processing speeds have been increased. The work has been set up in parallel lines rather than single lines to make more effective use of equipment and manpower.

Demand Custom Quality—With the improved methods and machines now available, the user's demands for custom features can be met. Closer tolerances, better surface finishes, tailored edges and improved metallurgical properties are only a few of the demands made by steel users for which the producers have equipped themselves.

CLOSE CONTROL—High carbon steel flattening mill operates at 3300 fpm. The speed of the mill is combined with large reel capacities to permit longer production runs and more efficient material handling.

REEVES Vari-Speed Motodrive

packed with new flexibility . . . broader production use

Now available in this compact design, Reeves Vari-Speed Motodrives deliver 2:1 through 10:1 speed variation, 1.8 through 4660 rpm . . . ¼ to 20 hp.

The infinitely variable output speeds meet almost every production need.

You can get these drives with output shaft on same or opposite side of the motor; vertical, 45°, horizontal or trunnion models; no reducer, and single, double or triple stage reductions . . . hundreds of space saving assemblies. Reeves provides a full range of modifications, accessories, and manual, remote or automatic controls. G-1639

Write today for complete data on sizes 100-500 (¼-20 hp) and sizes 8000 (25-40 hp)

REEVES PULLEY COMPANY
Division of **RELIANCE** ELECTRIC AND ENGINEERING CO.
COLUMBUS, INDIANA
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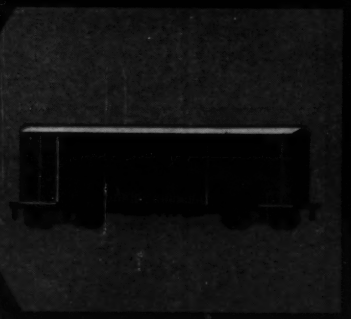
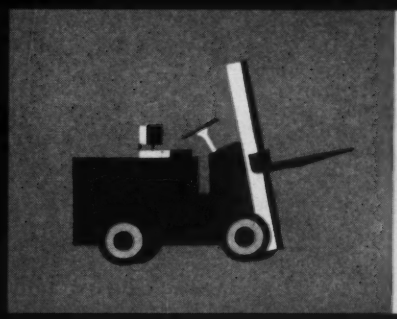
R MASTER
REEVES

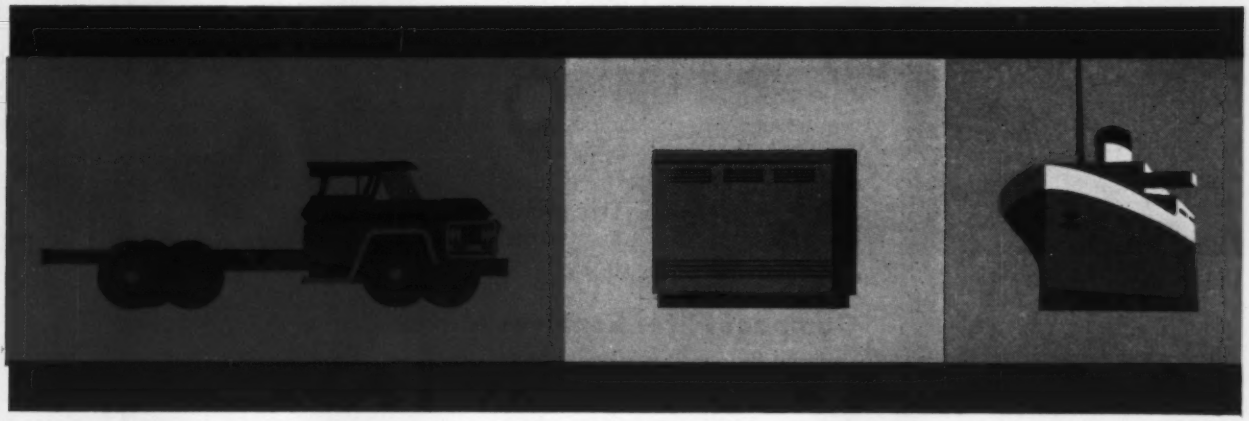
DESIGN FOR
LESS WEIGHT AND
LONGER LIFE IN YOUR
PRODUCT WITH

N-A-X HIGH-TENSILE





STEEL



You can design light weight, longer life, and economy into your products by including N-A-X HIGH-TENSILE in your plans and specifications. This versatile, corrosion-resisting, low-alloy, high-strength steel has many attractive features of special value to designers and manufacturers. For example:

- It is 50% stronger than mild carbon steel.
- It offers superior resistance to atmospheric corrosion.
- It has high fatigue life and great toughness.
- It has greater resistance to abrasion or wear.
- It has great paint adhesion, with less underfilm corrosion.
- It is readily welded by any process.
- It is stable against aging.
- It polishes to a high luster at minimum cost.
- It can be cold formed readily into difficult stampings.

With its many diversified applications in modern metal design, it will pay you to investigate N-A-X HIGH-TENSILE for savings in weight, in production time and for longer product life. A thoroughly competent metallurgical service organization is available to work with you on any application problem you may have. Write, wire or phone Product Development Department, Great Lakes Steel Corporation, Detroit 29, Michigan.

N·A·X
HIGH-TENSILE STEEL

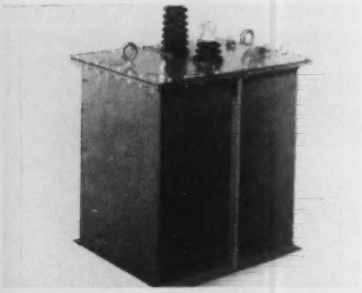
A PRODUCT OF

GREAT LAKES STEEL

Detroit 29, Michigan

Great Lakes Steel is a Division of **NATIONAL STEEL CORPORATION**

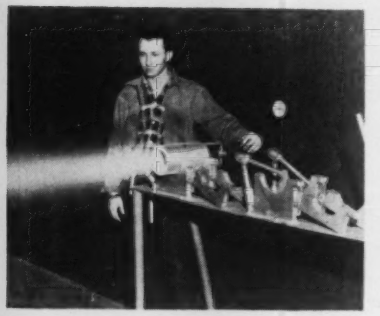
New Materials and Components



DC Charging Reactors—Pulse Modulator Uses

Custom designed, dc charging reactors are used in pulse modulators for klystrons in linear accelerators and high power radar. The dc charging reactors may be epoxy-resin encapsulated or oil insulated, depending on the requirements. A typical unit is oil insulated and water cooled. It operates at 8-amp dc average current, from a dc source voltage of 15 kv; and its peak current rating is 20 amp. Inductance rating is 0.5 henry. The pulse repetition rate for this reactor is 800 pulsations per second. (Electro Engineering Works)

For more data circle No. 27 on postcard, p. 133



Burners Produce Flame to Full Heat, Instantly

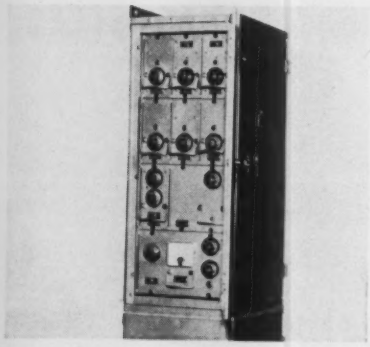
Inspirator burners fill suitable applications in any plant where high-pressure gas (5 lb or more) is used. These include: annealing and heat-treating furnaces, ladle heaters, core ovens, foundries, drying applications, tunnel kilns, periodic kilns, and the ceramic field. This burner uses atmospheric air to mix with the fuel, and may attain a fuel savings of 30 pct, depending upon application. It is 16-in. long by 5-in. in diam; weighs 15-¾ lb, and has a range from 20,000 Btu minimum to 1,500,000 Btu maximum. The burner flame burns with a pulsating action. (E. W. Bliss Co.)

For more data circle No. 28 on postcard, p. 133

Compact Filter Removes Matter Small As 1 Micron

Easily installed, a compact filter filters up to 300 gal of fluid per hour. For oil, coolant and hydraulic lines, the unit is 12 in. in overall height and 9 in. in diam. Fluids passing through the filter are forced through multiple layers of diatomaceous earth powder and fine-mesh monel screen. The unique combination of natural and mechanical filtering elements, traps suspended solids and foreign particles down to the size of 1 micron. Particles which feed bacteria are removed and fluid spoilage prevented. All matter big enough to increase friction heat or scratch high-finish surfaces is filtered out. (Wire Cloth Products, Inc.)

For more data circle No. 29 on postcard, p. 133



Resistance Welding Control Has Misfire Detector

A resistance welding control has an ignitron misfire detector, as optional equipment. Any misfire of the control's ignitron contactors trips a relay and gives an indication to the operator. Should one tube fail to fire, the welder skips. Then, the second tube fires twice in succession. This may saturate the transformer and raise exciting current to a high value that could damage the other ignitron. The detector gives an instant indication of improper welds, useful in automatic seam welding of materials with a narrow plastic temperature range. The detector may be used to operate a signal light or horn, counter, marking device, reject mechanism, shutdown circuit, or any combination of these. (General Electric Co.)

For more data circle No. 30 on postcard, p. 133

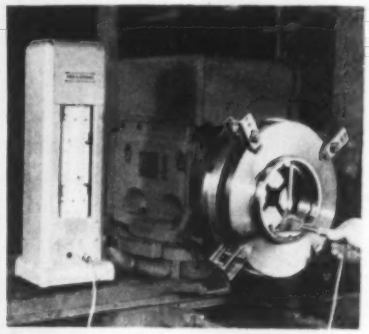
Regulates Pressure

All stainless steel, a pressure regulator eliminates the traditional problems of flaking; and eventual destruction common with standard and plated regulators used in corrosive service. To cover a wide range of corrosion-resistance, they are made of either stainless steel or monel. Non-metallic parts are corrosion resistant, too. The maximum inlet pressure of the series is 2000 psig. Delivery pressures up to 125 psig are available, depending on the model. (Hoke Inc.)

For more data circle No. 31 on postcard, p. 133

Improves Accuracy

Speeding and improving grinding accuracy to fine tolerances, a gage combines low amplification long gaging range and high amplification close tolerance inspection in automatic sequence. Any time a measurement is made, the right-hand



column shows part size within the 0.0018-in. range; the left-hand column spreads the final two thousandths over 4 in. The instrument consists of a dual column gage; a special 3- to 12-in. diam adjustable gage; calibrator, and hose. (The Sheffield Corp.)

For more data circle No. 32 on postcard, p. 133

Vitrified Bonds

Deeper, heavier cutting, and faster production with a cooler cutting surface is possible with the vitrified bonds, for aluminox grinding wheels and segments. One bonded wheel is ideal for form work, and where the wheel must hold its corners with a minimum of dressing. This bond is compounded to resist loading. The other bonded wheel features controlled porosity, and is

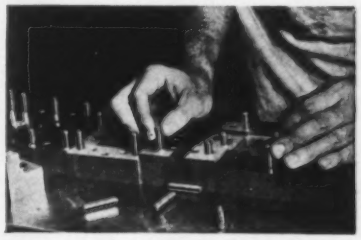
ALLEN

ALLEN is the dowel pin that gives you PLUSES !

Your ALLEN Industrial Distributor can show you a good many ways to use ALLEN Dowel Pins, in addition to conventional uses in tool and die work. You can use them as economical roller bearings, axles, precision plugs, hinge and wrist pins—and in many other ways.

You can cut the cost of your product substantially, too—because your ALLEN Distributor can supply these strong, accurate, mirror-finished Dowel Pins in standard sizes right from stock.

Made of special Allenoy steel; surface hardened to 62-64 Rockwell C; precision ground to .0001" with micro-inch finish of 6 RMS max. Check your Allen Handbook or Catalog for detailed specs and standard sizes, or write direct for samples and technical information.



Genuine ALLEN products are available only through your ALLEN Distributor—he's always ready, willing and able to give you prompt, practical service.

50 ANNIVERSARY YEAR ALLEN HEAD 1910-1960

ALLEN MANUFACTURING COMPANY

HARTFORD 1, CONNECTICUT, U.S.A.

specifically designed for high production and heavy cuts. This bond is exceptionally tough and durable for fast stock removal. (American Emery Wheel Works)

For more data circle No. 33 on postcard, p. 133

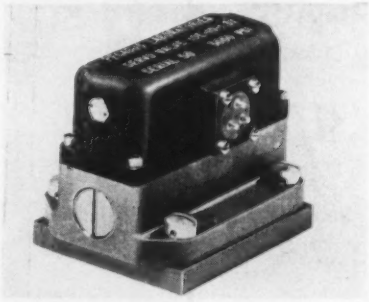
Self-Wicking Lubricant

Lifetime - lubricated sleeve bearings may now be designed through the use of a self-wicking lubricant. Sleeve bearings lubricated with this self-wicking lubricant are also reported to be exceptionally resistant to extreme moisture and cold conditions. The bearings perform satisfactorily at continuous temperatures to 200°F and under high loading. Pour point of the formulation is −25°F. The new lubricant may be injected automatically during bearing assembly, eliminating the numerous hand operations required to insert a die-cut felt wick. The material is a combination of oil and minutely-particled cellulose fibers, which has the feel and appearance of a grease. But, it's more than 85 pct fine lubricating oil by weight, and occupies hardly any greater volume than the contained oil. It possesses the unique property of releasing and reabsorbing oil, as required, to maintain the bearing oil film. (Permawick Co.)

For more data circle No. 34 on postcard, p. 133

Servo Valve

An electro-hydraulic servo-valve, for missile and aircraft service, weighs only 0.8 lb. It delivers up to 2 gpm, consists of a powerful elec-

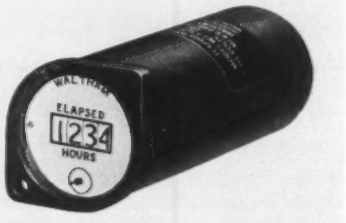


tro-mechanical actuator, or force motor, a zero lapped four-way valve and frictionless, symmetrical spool boost system. (Pegasus Laboratories, Inc.)

For more data circle No. 35 on postcard, p. 133

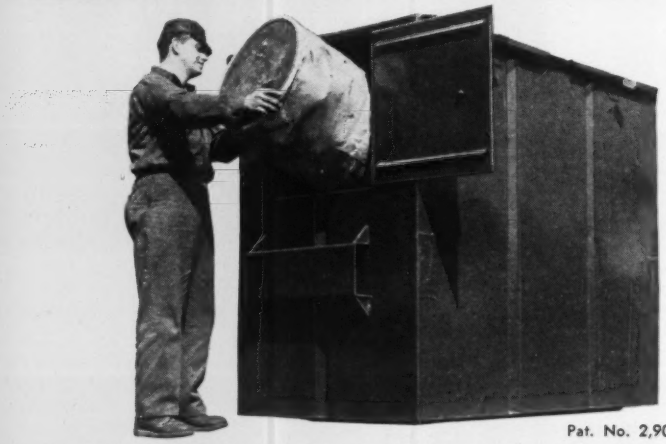
Elapsed-Time Indicator

Featuring digital readout, a subminiature elapsed - time indicator weighs just 3-¾ oz, measures 1-1/16 in. OD x 2-¾ in. maximum. It operates at 360-440 cycles per second with a 2½-w maximum



power input. The digital presentation runs to 9999 hours and the numerals are 5/32-in. high. Other important features include jewel bearings, an ultra - precision gear train with a 1.8 million to 1 ratio, and a very low inertia motor. The

How our small plant solved its waste disposal problem WITHOUT CAPITAL OUTLAY...



Pat. No. 2,900,096

DEMPSTER - DUMPMASTER Equipped Hauler Provides Containers and Service for Small Fee

Our small Midwestern manufacturing firm did not generate enough refuse to justify ownership of its own refuse disposal system. Yet, it was plagued by unsightly trash piles, fire hazards and scattered refuse in the plant yard.

Our plant engineer then heard of a DEMPSTER-DUMPMASTER equipped private hauler in the adjoining city. A survey revealed that two big-capacity refuse containers, placed one at each end of the plant, would handle the entire refuse accumulation.

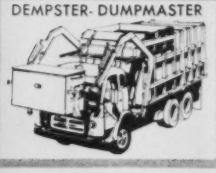
The private hauler placed the containers, and a small monthly fee covered maintenance, labor, hauling and dumping refuse. No capital outlay was involved, disposal costs were reduced, and plant housekeeping was vastly improved.

In all major cities, private haulers who own DEMPSTER-DUMPMASTER equipment render fast, efficient, low-cost refuse storage and collection service. They place one or 100 containers at your service for a reasonable fee. A free brochure describes their service in detail.

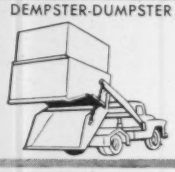
Free Brochure and Name of Nearest Private Hauler on Request

Dept. IA-6 DEMPSTER BROTHERS Knoxville 17, Tenn.

DEMPSTER-DUMPMASTER



DEMPSTER-DUMPSTER



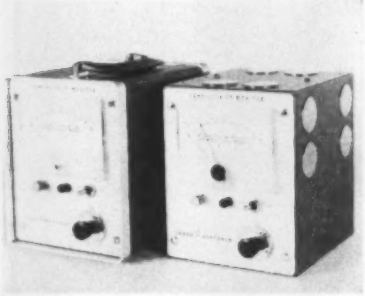
DEMPSTER DUMPMASTER EQUIPPED PRIVATE HAULERS

indicator was designed to be light and small enough to accompany "black boxes" of critical equipment anywhere. It provides a continuous and easy-to-read record of operational use and life which is applicable for reliability programs and life testing, design and systems analysis, and utilization studies. (Waltham Precision Instrument Co.)

For more data circle No. 36 on postcard, p. 133

Conductivity Monitor

Continuously indicating an electrolytic conductivity measurement, a conductivity monitor is designed for industrial use. Panel- or wall-mounted, this reliable, completely transistorized instrument can be supplied with automatic or manual temperature compensation; and with



continuous alarm signalling. The monitor also produces an output dc signal for transmission to a recorder, or other data-logging equipment. Also available is a new portable conductivity monitor, housed in a light metal case for "on-location" checking. (Leeds & Northrup Co.)

For more data circle No. 37 on postcard, p. 133

Locking Dowels

Locking dowels and bushings, installed in pattern plates and the cope and drag walls of the company's foundry flasks, prevent flask walls from "spreading" when under heavy squeeze pressure. These dowel assemblies, eight to the average size flask, "lock" flask walls to the pattern plate to prevent flask deformation. When the pattern plate is removed, cope and drag walls "lock" together, so they open as a unit when corners are "popped-open"—eliminating strain on flask pins and bushings. Assemblies can be used with ⅜-, 7/16- and ½-in. pattern match plates. They are made in two sizes, for flasks with 1- to 1¼-in. flanges, and 1½- to 2-in. flanges. (Hines Flask Co.)

For more data circle No. 38 on postcard, p. 133

Offset Boring Heads

Precision offset boring heads bore deep or shallow, with one standard length boring bar. They are interchangeable for use on jig borers, boring mills or turret lathes. One of the most appealing features about the new heads is that plants can operate with a reduced inventory, and less replacement of parts because one shank is adjustable to boring at various depths. The number designated on the direct-reading dial will increase the bore diameter the same amount. (Everede Tool Co.)

For more data circle No. 39 on postcard, p. 133

Bearing Wheels

Double - duty, "V" - grooved, sealed bearing wheels roll on floor

PETE, YOU PRETZEL-BENDER-TURNED-DESIGNER, YOUR NEW PART WILL NEED AT LEAST 158 SEPARATE MACHINING STEPS!
NEVER FEAR, POINDEXTER, ARWOOD WILL INVESTMENT CAST IT AND ALL WE'LL NEED IS A COUPLE OF GRINDS.
Richard

Machine the simple . . . cast the complex

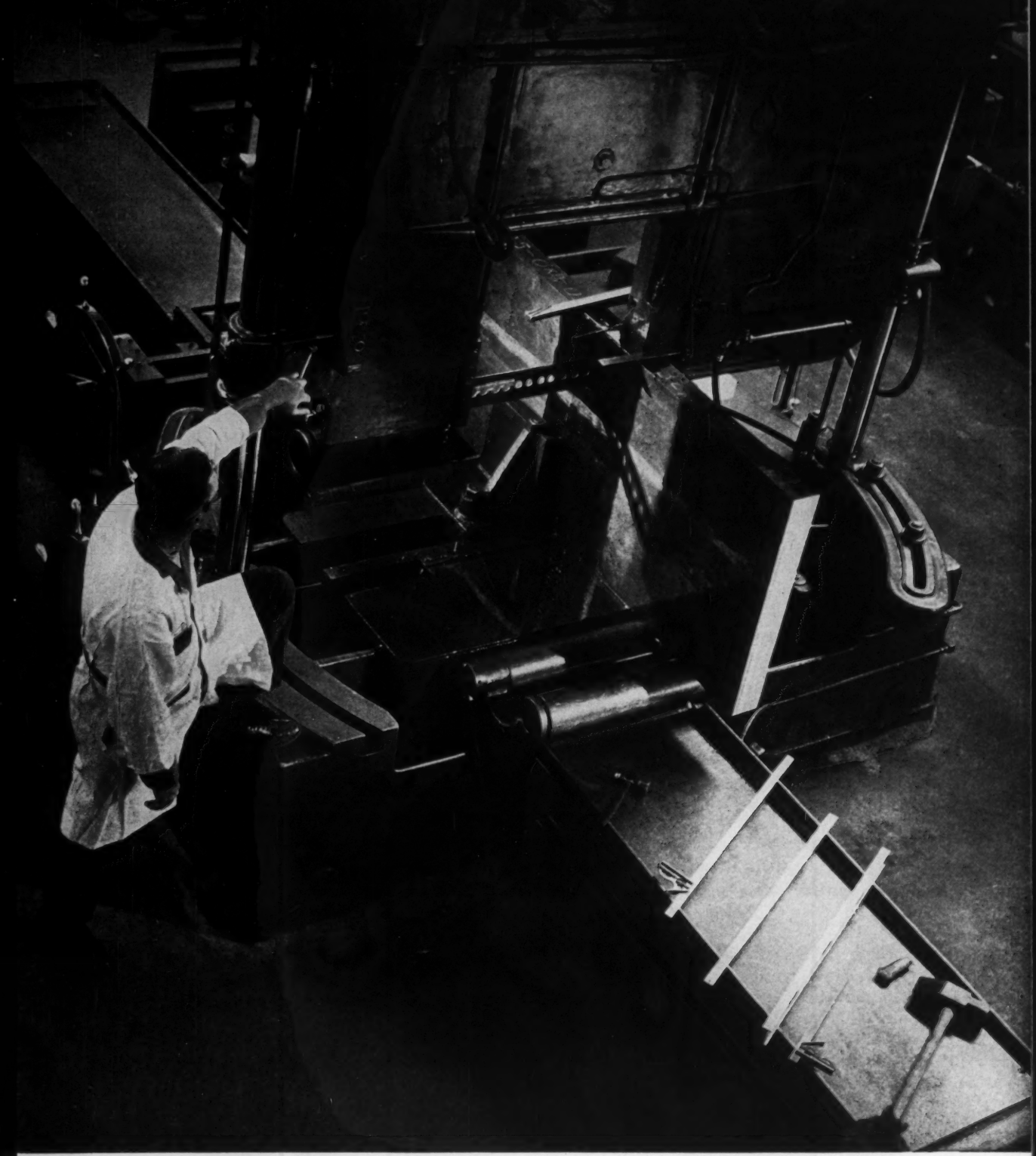
A complete service from design through tooling, production and finish machining. Seventy-one engineering representatives from coast to coast.

arwood

ARWOOD CORPORATION • 327A West 44th Street, New York 36, New York

PLANTS IN BROOKLYN, N. Y.; TILTON, N. H.; GROTON, CONN.; LOS ANGELES AND LA VERNE, CALIF.

integrated CRUCIBLE steel service



The customer needed plastic mold steel cut to his specs as fast as he could get it. The Crucible warehouse confirmed his order, gave him immediate delivery because it had both the steel and the saw (big 24" x 42" hacksaws which can slice a 40" block in 4-4½ hours).

maintains a variety of local facilities for handling customers' special requirements

"We *regularly* rely on the Crucible warehouse's equipment. Why, it would take us all day to cut steels they can cut in minutes. We've tried to do these cutting jobs ourselves and, frankly, we lose money nearly every time."

This purchasing agent's words are probably typical because countless companies, all over the country, rely on the 31 local Crucible warehouses for handling their special needs. Unusual cutting of specialty steel grades and sizes is just an example. Or, if a warehouse can't handle extras, such as forging, grinding, machining, boring, polishing, etc. itself, it arranges to have them done conveniently and economically outside.

It's entirely possible that your plant has these facilities. Even so, it can pay you to find out what the local Crucible warehouse has to offer. As one materials buyer put it:

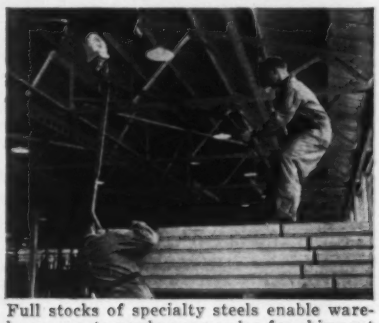
"We have a 'get to know the suppliers' policy. I've visited the Crucible warehouse personally and made a list of its equipment. Here it is – under 'Suppliers' Facilities.' Two weeks ago, when all our saws were tied up, we had the Crucible warehouse cut the steels. They did it immediately, so my list paid off."

All Crucible warehouses maintain stocks, services and facilities to serve you. If you'd like to know more about them, phone or visit the warehouse nearest you – *any time*. Its facilities and services are part of Crucible's integrated operation, from ore to mill and warehouse delivery to you. *Crucible Steel Company of America, Dept. PF06, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

Customers' Master Files quickly give Inside Account Salesmen details on your receiving schedules and special requirements.

Inside Account Salesmen keep reference sources handy — give you fast breakdowns of analyses, or heat-treating, machining data.

Fleet of trucks and special delivery vehicles maintained at each warehouse ensure prompt, nearby deliveries.



Full stocks of specialty steels enable warehousemen to ready your order for shipment overnight — or earlier.

STOCK LIST

Keeps you up-to-date on local stocks of specialty steels. Just ask the Crucible salesman to place your name on the regular mailing list.

One Source For All These Steels

TOOL STEELS–Water, oil, air hardening, shock resisting, hot work, plastic and die casting steels in all forms, including bars, sheets, plates, drill rod, hollow bars, forgings and flat ground stocks

HIGH SPEED STEELS–Crucible's famous "Rex"® steels: Rex Thrift Finish rounds, hot rolled and cold drawn flats and squares, drill rod, forgings, sheets, plates, and tool bits

STAINLESS STEEL – Bars, sheet, strip, wire, cold heading wire, metalizing wire, plates, angles

FREE MACHINING STEELS – Crucible Max-el® rounds, hexagons, plates and brake die steel

ALLOY STEELS – bars, billets, strip and sheet

COLD ROLLED CARBON SPRING STEELS

DRILL STEELS – Hollow and solid drill steels

ALUMINUM EXTRUSION DIE STEELS

HOLLOW TOOL STEEL

WELDING AND HARD FACING ROD

PLASTIC MOLD STEELS

PERMANENT MAGNETS

– and many others

CRUCIBLE STEEL COMPANY OF AMERICA

Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Columbus • Dallas • Dayton Denver • Detroit • Grand Rapids • Harrison • Houston • Indianapolis • Kansas City • Los Angeles • Milwaukee • New Haven • New York Philadelphia • Pittsburgh • Portland, Ore. • Providence • Rockford • Salt Lake City • San Francisco • Seattle • Springfield, Mass. • St. Louis St. Paul • Syracuse • Tampa • Toledo • Tulsa • Toronto, Ont.

surfaces or tracks. They meet a widespread industrial need for low-cost, in-plant handling, better utilization of floor space, and easier flow on production lines. The "V"-grooved wheel casters increase mobility of loads from 50 to 100 pct. When mounted on inverted angle-iron track, the line, available in pressweld or forgeweld medium and heavy-duty casters, can be adapted to move from floor to track with the aid of "V"-shaped lead ons; and around curves with curved channel guides or curved angle track. Various types of turntable switches provide for a 90-pct position change. Constructed of reinforced steel, the beveled-groove wheels are available in sizes from 4 to 10 in. (Colson Corp.)

For more data circle No. 40 on postcard, p. 133

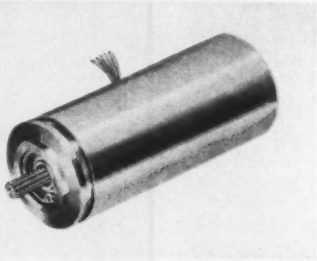
Dual Power Supply

Consisting of two separate regulated supplies on one chassis, with a common reference, a dual power supply provides ±300 v dc, each rated at 300 milliamperes. The supply also provides four line voltage connections, at the output connector, fused and switched at the main power switch. A separate front panel switch is provided for applying the ±300 v dc. The transient response, the regulation, and freedom from noise are excellent. (George A. Philbrick Researches, Inc.)

For more data circle No. 41 on postcard, p. 133

Servo Motor

For feedback damping applications, a —55° to +125°C adjustable, viscous damped servo motor consumes less power and presents no null or phasing problems in the feedback loop. Damping and gain can be independently adjusted. No-load speed is quickly and simply adjusted between 6500 and 3250 rpm



to exact speed required. Housing is stainless steel bright finish, rotor moment of inertia 0.65 g-cm², stall current 0.113 amp fixed phase and 0.077 control phase, stall power 2.4 w per phase. The motor is 1.75-in. long, and weighs 2 oz. (John Oster Mfg. Co.)

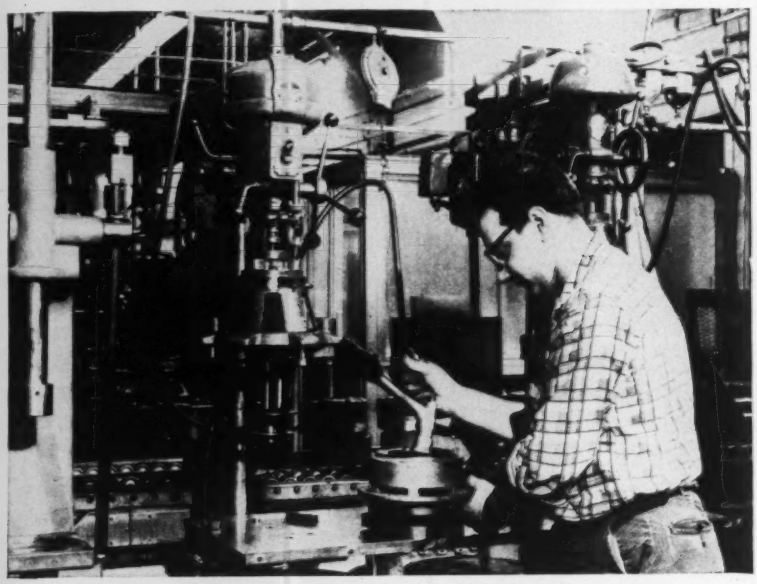
For more data circle No. 42 on postcard, p. 133

Tapping Attachment

A tapping attachment features in its design a free axial floating drive spindle. This permits taps to determine their own lead for advancing and retracting during the tapping cycle. No human or mechanical lead pressure is required. Torque adjustments are quickly and easily made, by simply turning the knurled cap at the top of the unit to the desired setting. The attachment has a rated capacity in mild steel from #10 to ⅝-in.-18 taps. (Tapmatic Corp.)

For more data circle No. 43 on postcard, p. 133

WALKER-TURNER 20″ Drill Press



Pays for itself in six months

Drilling and tapping of parts used in assembling floor polishers at General Electric in Patterson, N. J., was formerly done on one Walker-Turner 20″ drill press. By adding a second W-T 20″ and equipping both drill presses with multiple-spindle attachments, output was tripled—and additional tooling paid for itself in six months.

You get this same kind of extra value in all W-T "Light-Heavyweight" metalworking tools because they are fast, accurate and built for years of rugged use. Your Walker-Turner Distributor (listed under "TOOLS" or "MACHINE TOOLS" in the Yellow Pages) carries the complete line. He'll gladly show you 20″, 17″, 15″ and the new 14″ Hi Speed drill presses in a variety of models to fit *your* production needs, as well as a complete line of money-saving accessories.

FREE CATALOG—Shows the full line of W-T metalworking tools and accessories. Write: Rockwell Manufacturing Company, Walker-Turner Division, Dept. WF-28, 400 N. Lexington Ave., Pittsburgh 8, Pa. In Canada: Rockwell Manufacturing Company of Canada, Ltd., Guelph, Ontario.

WALKER-TURNER
"LIGHT-HEAVYWEIGHT" MACHINE TOOLS
another fine product by
ROCKWELL

NEW BOOKS

"Mechanics of Materials," by Higdon, Ohlsen and Stiles, treats the matter so, that as each new topic is introduced, an illustration is provided to help the reader visualize a physical design problem to which the theory applies. A large section of problems, relative to the subject, is included. Special attention is devoted to the problems that require an understanding of the principles of mechanics of materials. 502 pp. $7.75. John Wiley & Sons, Inc., 440 Park Ave. South, New York 16.

"ACA Index" analyzes the voting record of each member of Congress on critical issues of recent years. It tells how your Senators and Congressman voted on major issues: Foreign affairs, inflation, labor, national security, etc. A novel index is designed to give the "effect of legislators' votes as measured by moral, economic and Constitutional principles." 122 pp., 11 x 17 in., spiral bound, $15.00. Compiled by Americans for Constitutional Action, published by Human Events, 408 First St., S.E., Washington 3, D. C.

"Weld Flaw Evaluation," by S. T. Carpenter and R. F. Linsenmeyer, covers the mechanics of brittle fracture at different temperatures, by means of simulated flaws in selected materials. 121 pp. $2.75 per copy. Order PB 161322, Office of Technical Service, U. S. Department of Commerce, Washington 25.

"Extractive Metallurgy," by Joseph Newton, covers the whole field of extractive metallurgy. It presents the subject through the unit process method, in preference to the metal-by-metal approach. The author discusses the basic principles rather than detailed practices, and also includes topics from physical metallurgy—such as metal crystals, equilibrium diagrams, and Gibb's phase rule. The book has been written primarily as a text for a first course in extractive metallurgy. It provides all the fundamental information required by the reader who is unfamiliar with the subject. Copy includes 532 pp. Price $9.75. John Wiley & Sons, Inc., 440 Park Ave. South, New York 16.

"Radiation Pyrometry and Its Underlying Principles of Radiant Heat Transfer," by Thomas R. Harrison, is designed to help the reader analyze and solve the many questions concerning the use of radiation pyrometers in a variety of industrial conditions. The book presents both the theoretical and practical principles of radiation pyrometry. It also lists a number of valuable tables that show radiation pyrometer calibrations, and optical characteristics of various substances. 234 pp. $12.00. John Wiley & Sons, Inc., 440 Park Ave. South, New York 16.

The revolutionary Bliss Pulsation Burner

produces temperatures never before achieved with oil or natural gas. Burning oil, it can reach a searing 3450°F. On 1000 BTU/cu. ft. natural gas, it develops 3320°F. Both these extremely high temperatures are close to the theoretical limits for these two fuels. Foundries, smelters, heat treaters and other metal processers have been quick to take advantage of the remarkable combustion efficiency of these new burners. To them, it has meant faster heating cycles, cleaner flue gases, and above all, fuel economy that cuts from 12% to 30% from their furnace overhead. Not to speak of reduced maintenance on refractory linings.

To learn how the Bliss Burner can increase the heat output in your plant while it's saving you money in fuel and furnace maintenance, write today for our Bulletin No. 60. It's yours for the asking.

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BLISS is more than a name—it's a guarantee

Ultrasonic Flaw Detection now Ultra-Practical in every shop!

THE NEW BRANSON

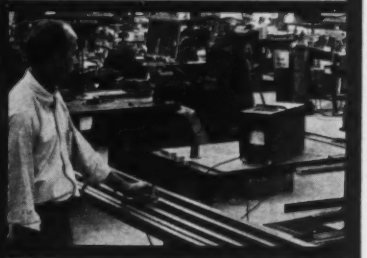
SONORAY®

MODEL 5

pulse-echo type instrument

combines the highest performance yet achieved with the smallest size, weight and price in the field. It is equally at home in contact and immersed work.

Every metalworking shop can now afford quick, accurate, inexpensive tests on internal structure of Bar Stock, Strip, Plate, Castings, Weldments. Brazed Assemblies, Machinery Shafts, etc.



SONORAY® Ultrasonic Flaw Detector testing aluminum bar stock; easily probes the full 12-foot length as well as through thickness.

SONORAY® Model 5 clearly resolves 3/64" FBH at 3/16" in contact at 2.25 mc/s — reveals 1/64" FBH full-scale at 2.25 and 5.0 mc/s — brings laboratory precision into the field with simplified controls, a weight of only 37 pounds and a price of . . . . . $2750.

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New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 133.

Precious Metals

Gold, silver, and platinum-group metals, in various solid, clad, and cored mill forms, are described in a new six-page brochure. The brochure outlines sizes, compositions, and uses of solid and clad gold and silver strip, tubing, wire, brazing alloys, and waveguide tubing. Typical platinum and platinum alloy clad-metal combinations are noted, along with basic specifications for sheet, strip, rod, wire, foil, and tubing. (Texas Instruments Inc.)

For free copy circle No. 1 on postcard, p. 133

Hand Tools

Consisting of 16-pages, a two-color catalog illustrates and describes in detail a wide variety of hand tools. Included are wrenches, pliers, cutters, screw drivers, punches, chisels, sockets, handles, extensions, socket sets, tool sets, tool chests, feeler gages and miscellaneous tools. (Owatonna Tool Co.)

For free copy circle No. 2 on postcard, p. 133

Strain Gage

A line of sub-miniature, free-filament wire strain gages, designed for accurate strain measurement on any test surface or material in a wide variety of applications including high temperature, are discussed in a four-page, data sheet. The data sheet contains line drawings, graphs and tables to support the data and specifications concerning this strain gage. (Baldwin - Lima - Hamilton Corp.)

For free copy circle No. 3 on postcard, p. 133

Press-Room Equipment

Consisting of 21 pages, a catalog illustrates and describes units in the line of press-room equipment. They include slide feeds, roll feeds, stock reels, stock straighteners, coil cradles. (U. S. Tool Co.)

For free copy circle No. 4 on postcard, p. 133

Output Verification

The verification of the output of power tools is a problem for users of these tools. It is complicated by the many variables involved. To control these variables, and thus make accurate verification possible, a new program is presented in a four-page brochure. The literature gives details of this unique program, and outlines the equipment and step-by-step procedures used to obtain complete verification. (The Skidmore-Wilhelm Mfg. Co.)

For free copy circle No. 5 on postcard, p. 133

Ball Bearings

New concepts for applying thin-sectioned, large-bore ball bearings to equipment designs are presented in a 28-page engineering booklet. Installation drawings illustrate how these thin bearings save weight, space and cost. Applications shown range from wire-twisting machines to paper - making machine press rolls, and from heavy-duty lathes to submarine periscopes. Pictured in the booklet are twenty-three drawings of commercial and space-

age designs. (For free copy write on company letterhead to The Kaydon Engineering Corp., McCrackey St., Muskegon, Mich.)

Motor-Use Guide

A 16-page motor-application guide outlines motor characteristics. It also includes up-to-date information on the company's motor designs. (Century Electric Co.)

For free copy circle No. 6 on postcard, p. 133

Air and Vacuum Pumps

Described in a 32-page catalog are rotary, positive air pressure and high-vacuum pumps, gas boosters and air motors. The catalog gives details of construction, dimensions, capacities, performance curves on all pumps, plus comprehensive engineering and application data. Included are 2- and 4-vane types, single- and double-cylinder, fan-cooled, water-cooled, air-cooled, oil-less, motor-driven, belt-driven, direct-coupled, automatically-controlled and integral pump and motor models. (Leiman Bros., Inc.)

For free copy circle No. 7 on postcard, p. 133

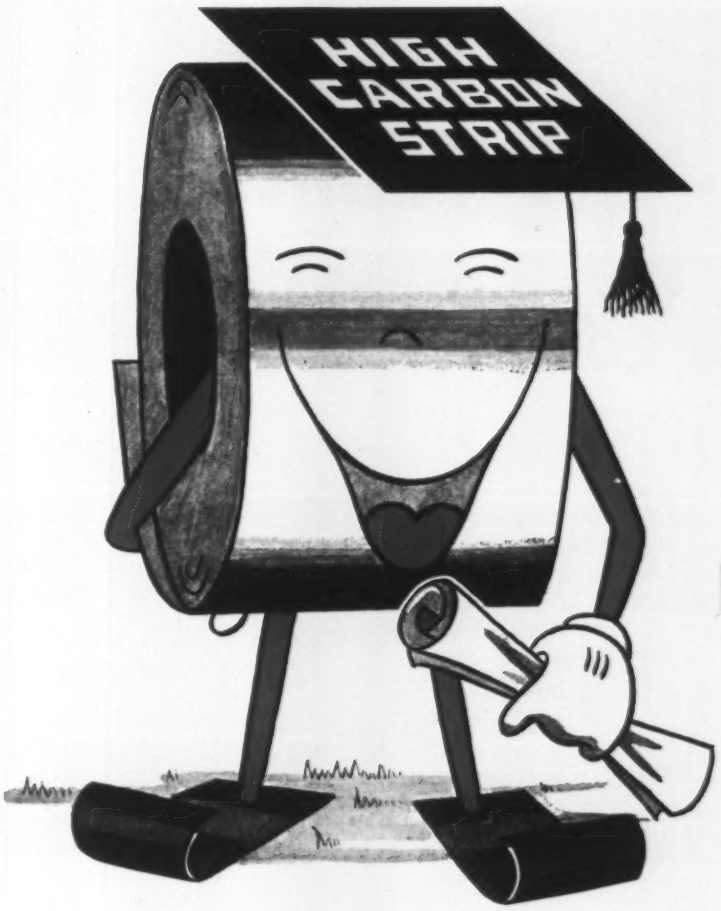
Copper-Clad Laminates

Technical information on copper-clad laminates, composite sheets made by facing selected base laminated plastics with copper foil on one or both sides, is given in a data sheet. The four-page bulletin lists the advantages for copper-clad laminates in the production of printed circuits. A table lists engineering data for eight grades of copper-clad laminates, including bond strength, hot solder resistance and heat resistance. Another table lists minimum/maximum physical, mechanical, and electrical properties for the eight base laminates. (Taylor Fibre Co.)

For free copy circle No. 8 on postcard, p. 133

Motorized Pulleys

Dealing with motorized pulleys, a catalog gives specifications and dimensions for the latest models from 1 to 75 hp; and with face widths from 22 to 57 in. Also included in the publication are in-



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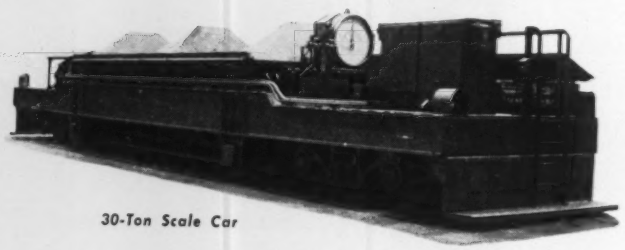
Which Counts Most?



30-Ton Scale Car

Cost . . . performance . . . safety features? Usually it's all these, plus the solution of individual load and schedule requirements.

Atlas' 63 years of custom engineering, coupled with matching care in manufacturing, is your assurance of dependable service.

Since 1896 designers and builders of Scale Charging Cars . . . Ore Transfers . . . Coke Quenchers . . . Coal Larries . . . Door Machines . . . Safety-Type Transfers . . . Battery Locomotives . . .

ATLAS CAR & MFG. COMPANY

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FREE LITERATURE

stallation diagrams, descriptions of available accessories, and modifications for specialized conveyor drive installations. A feature of the selection catalog is a section of four charts for determination of the proper pulley for a specific installation. (Western Conveyor Co.)

For free copy circle No. 9 on postcard, p. 133

Handling Gases

A wall chart illustrates recommended procedures for the safe handling of all types of compressed gases. The chart shows the proper methods of receiving cylinders, storage, moving, handling empty cylinders, and using compressed gases. The chart measures 14 x 21 in., and is designed for wall mounting wherever compressed gases are used. (The Matheson Co.)

For free copy circle No. 10 on postcard, p. 133

Flow Tube

For special requirements in the metering of petroleum, chemicals, gases, steam and other process fluids at low or high pressures and temperatures, a weldment-type flow tube is the subject of a bulletin. The weldment-type flow tube offers the process engineer design flexibility sizes from 1 in. to over 120 in. in a variety of metals, maximum head recovery, short laying length, stable coefficient and predictable accuracy. The four-page bulletin contains drawings of the ten different styles together with engineering and ordering data. (B-I-F Industries, Inc.)

For free copy circle No. 11 on postcard, p. 133

Welding Rods

Given in a data sheet are welding and brazing characteristics, specifications and chemical analysis, and an identification guide for six welding filler rods. Procedures for welding and brazing, as well as typical applications, are included in the sheets. (National Cylinder Gas Div. of Chemetron Corp.)

For free copy circle No. 12 on postcard, p. 133

DoALL

STAINLESS STEEL GAGE BLOCKS

...offer greatest stability ever achieved!

Here's important news—and another DoALL first in the perfection of gage blocks. Periodic recall and inspection at DoALL's metrology laboratory of 1200 stainless steel gage blocks under field tests for 18 months in laboratories and shops of leading gage block users show no growth or shrinkage discernible by standard comparison techniques.

BETTER IN EVERY WAY!

Check these 7 added money-saving advantages:

- ✓ **HARDNESS**—Over 68 Rockwell C any place on block surface.
- ✓ **WEAR**—More than three times the life of ordinary steel gage blocks.
- ✓ **CORROSION RESISTANCE**—Four to five times greater than regular steel blocks.
- ✓ **SURFACE FINISH**—Better than can be measured with a surface analyzer—.09 microinch AA.
- ✓ **WRINGABILITY**—Stainless steel gage blocks wring better than ordinary steel gage blocks.
- ✓ **COEFFICIENT OF EXPANSION**—Stainless steel is in the range of most engineering materials.
- ✓ **BRINELLING**—Repeated spindle impacts do not Brinell the DoALL stainless steel blocks.

—plus these important bonus items:

With each set of DoALL stainless steel gage blocks you get these extra values at no charge:

1. a certificate of inspection covering each block in the set;
2. a complete kit for the care of gage blocks;
3. a compact, pocket-size plastic case;
4. educational booklets that explain how to make your set of gage blocks most useful and how to keep them in usable condition.

DoALL stainless steel gage blocks are available in standard sets of 38, 81, 84, 85, 86 and 88 pieces. Blocks are made in all decimal sizes from .050 in. to 4.000 in. and in fractional sizes from 1/16 in. to 7/64 in. Accuracies for AA blocks: plus .000002 in., minus .000002 in. Accuracies for A + blocks: plus .000004 in., minus .000002 in.

Call your local DoALL store today. Ask your DoALL Gage Specialist to demonstrate the new stainless steel gage blocks—without obligation.

GB—35A

THIS IS A TYPICAL DoALL STORE

The DoALL Company, Des Plaines, Illinois

Flash butt-welded ring from extruded material slashes away 64 lbs. of stainless 310

Only 1/3 as much material was required when a special extruded section was substituted for bulky bar stock in this flash butt-welded ring. By leaving 2/3 of the material at the mill, instead of hogging it out, Amweld saved its customer $76.83 per ring—plus hours of expensive machining. (Savings compared to the forgings originally used are even greater.)

Amweld is equipped to supply flash butt-welded rings and circular products in stainless, titanium, aluminum, as well as a wide variety of corrosion-resistant alloys. If you would like to know more about Amweld's welding, fabricating and complete machining facilities, phone or write.

GET THE FACTS ABOUT AMWELD

New 20-page catalog describes flash butt-welded rings and circular products manufactured by Amweld. Also booklet entitled, "How Flash Butt-Welded Rings are Made."

AMWELD® INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MFG. CO. • 120 DIETZ ROAD • WARREN, OHIO

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Automatic Machines

Highly informative, a 12-page catalog describes user benefits of automatic high-speed drilling, tapping and threading machines and systems. It illustrates the wide range of basic drilling operations these versatile machines perform, and shows highly interesting production feats. (Universal-Automatic Corp.)

For free copy circle No. 13 on postcard

Gear Shaving

A two-page, illustrated catalog sheet describes improved equipment and processes for shaving engine camshaft gears. The sheet describes the diagonal gear shaver that now provides a faster and more practical means of shaving camshaft gears. The diagonal shaving process, traverse angle, cutter selection and process advantages are discussed in detail. Four illustrations of various models of machines are included. (National Broach & Machine Co.)

For free copy circle No. 14 on postcard

Switch Catalog

Technical engineering data and ordering information is contained in new full line snap-action switch catalog. Enclosed and open, stack switches are featured for practically unlimited precision snap-action switch applications. (Cherry Electrical Products Corp.)

For free copy circle No. 15 on postcard

Mechanical Deburring

Four methods of mechanical deburring are detailed in a four-page folder. The literature describes and diagrams the methods, and gives numerous examples of their application. Illustrations and text show the various types of equipment available for the deburring processes to remove burrs or flash from machined parts, stampings, die castings, and powdered metal parts. (Wheelabrator Corp.)

For free copy circle No. 16 on postcard

Band Mill

Described and illustrated in an eight-page catalog is a vertical band sawing machine. It's specifically designed for band machining heavy and large workpieces with a 2-in. high-speed, steel saw band. Shown in the catalog are many typical band mill applications. These include shanking die blocks, sectioning castings, slicing huge billets and splitting large bearings and bushings. The specifications page contains, in addition to data about the machine, blueprint views of the front, side and top along with essential measurements. (The DoAll Co.)

For free copy circle No. 17 on postcard

Cylinders and Fittings

Printed in two colors, a 24-page catalog is sectionalized by products. It covers air cylinders, hydraulic cylinders, non-sag piston rods, high-speed cushions, adjustable - stroke cylinders, air - hydraulic boosters, air - oil circuits; and pipe-thread fittings for eliminating positioning problems and leakage at threaded connections. Simplified mounting and dimensional data and thrust charts permit quick, easy selection of bore sizes and determination of "overall" mounting dimensions of the various models shown. (Flick-Reedy Corp.)

For free copy circle No. 18 on postcard

Semiconductors

A semiconductor purchasing directory includes the newest power, high-speed switching, high-current, zener and diffused junction mesa type transistors. Also listed are the latest micro-diodes, voltage-variable capacitors and photo-sensitive devices. This 16-page comprehensive directory and buyer's pricing guide to transistors, diodes and rectifiers

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **6/23/60**

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61	62	63	64	65	66	67	68	69	70
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If you want more details on products advertised in this issue fill in below:

Page ..... Product .....

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INVALID WITHOUT COMPANY NAME—PLEASE TYPE OR PRINT

Name .....

Title .....

Product Manufactured .....

Company .....

Co. Address .....

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City ..... Zone .... State .....

FREE LITERATURE

covers semiconductors of eighteen major American manufacturers. (For free copy write on company letterhead to Allied Radio Corp., 100 N. Western Ave., Chicago 80)

Cast Alloy

Summarizing the results of years of research on high-alloy castings, a 12-page booklet lists 46 technical papers, articles, reprints and data sheets. Literature available on stainless and heat-resistant castings is described under the following categories: alloy selection, applications, research (corrosion and high temperature), engineering data, fabrication, foundry practice, metallurgical structure, properties, testing methods, and such general topics as purchasing of high-alloy castings. (Alloy Casting Institute)

For free copy circle No. 19 on postcard

Power Units

An informative 12-page product bulletin covers a complete line of power units for material-handling vehicles. Featured are detailed illustrations, complete product information and specifications for gasoline, diesel and LP-gas power units. An interesting series of drawings shows applications of units on every major type of material-handling truck and tractor. (The Ready-Power Co.)

For free copy circle No. 20 on postcard

Rubber Bumpers

Rubber bumpers for absorbing impact are the subject of a four-page folder. Uses listed for the bumpers are included in the folder. (Hewitt-Robins Inc.)

For free copy circle No. 21 on postcard

Chrome Reducer

For use in alkali cleaners and copper plating solutions, a chrome reducer is fully described in a two-page technical data sheet. The product is a dry, white granular powder used in soak or electrocleaners and cyanide copper plating solution to reduce hexavalent chromium. It eliminates adverse effects of this contaminant on subsequent electroplating. (MacDermid Inc.)

For free copy circle No. 22 on postcard

Machining Applications

Nine, high-velocity machining applications, of the manufacturer's throw-away inserts, are tabulated with brief records of their comparative performance advantages. Applications include finishing operations on alloys of low machinability and on cast iron and mild steel. The two-page bulletin also gives the most significant properties of the carbide alloy series in relation to its performance and the fine finishes produced. (Kennametal Inc.)

For free copy circle No. 23 on postcard

Tensioners and Sealers

Air-powered steel strapping tensioners and sealers are detailed in a folder. It describes eight tensioners, adjustable to supply uniformly the exact strap tension desired—from 750 to 3300 lb (at 90 psi); also described are seven pistol-grip and double-handle sealers. Half the folder is devoted to illustrated application stories of the tools in actual use. (Signode Steel Strapping Co.)

For free copy circle No. 24 on postcard

Recirculating Furnace

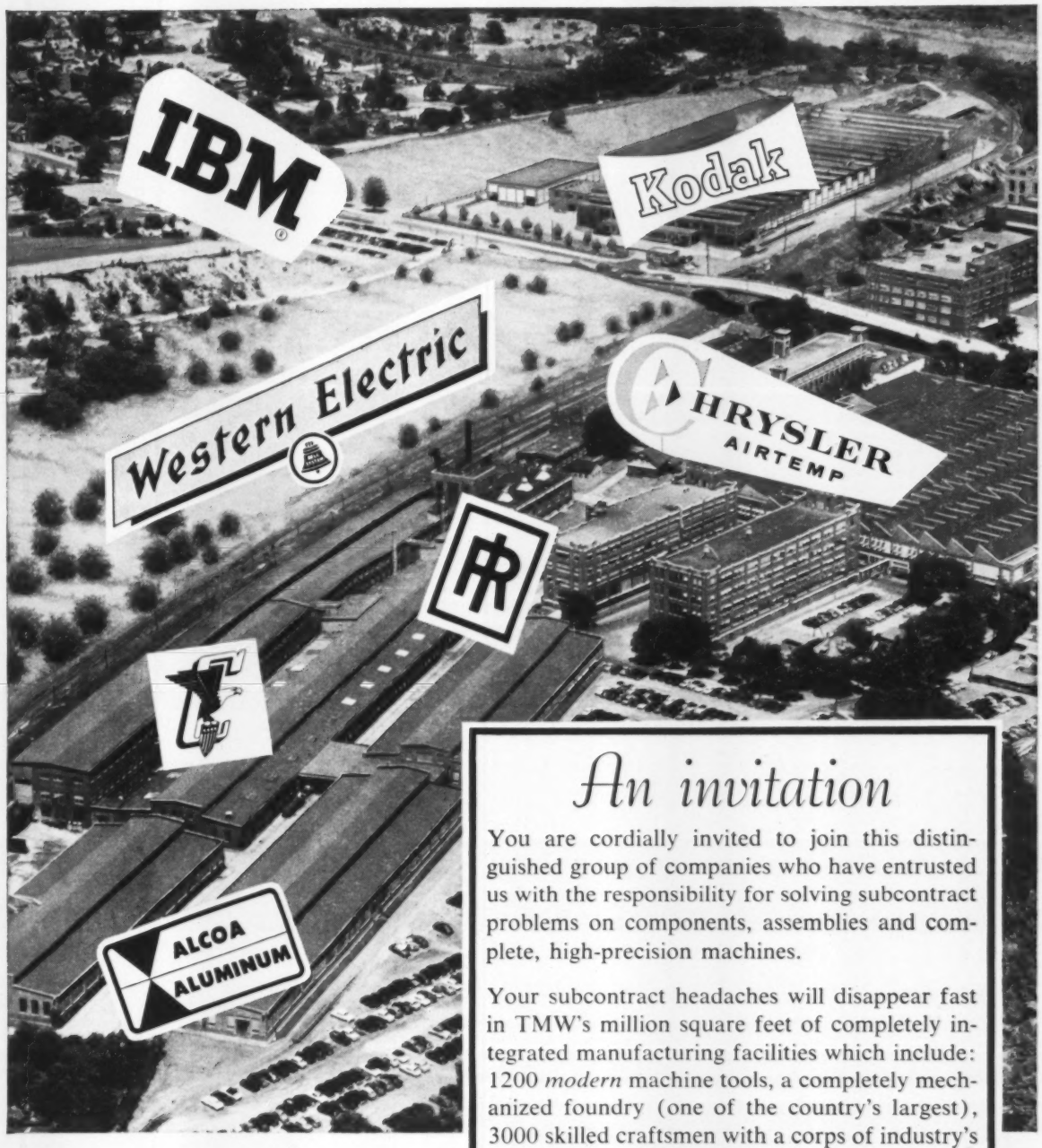
Fully illustrated, a bulletin describes the advantages and design features of a gas-fired or electric box-type recirculating furnace. This furnace has an operating range of 300°-1400°F. It can be used equally well for drawing, annealing, tempering and stress relieving of both nonferrous and ferrous alloys. Both small and large parts may be compactly loaded and heated under accurate temperature control. (Sunbeam Equipment Corp.)

For free copy circle No. 25 on postcard

Cutting Stainless

Cost-saving potential and metallurgical advantages of cutting stainless-steel plate, by the new tungsten-arc process, are described in an illustrated folder. (Jessop Steel Co.)

For free copy circle No. 26 on postcard



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Your subcontract headaches will disappear fast in TMW's million square feet of completely integrated manufacturing facilities which include: 1200 *modern* machine tools, a completely mechanized foundry (one of the country's largest), 3000 skilled craftsmen with a corps of industry's top designers and engineers.

TMW's facilities and 65 years' experience in precision (tolerance to 10ths) manufacturing is available to you *now*, on a short or long-term basis. For more details, or for new Facilities File Folder, call or write: Textile Machine Works, Contract Division, Reading, Penna.

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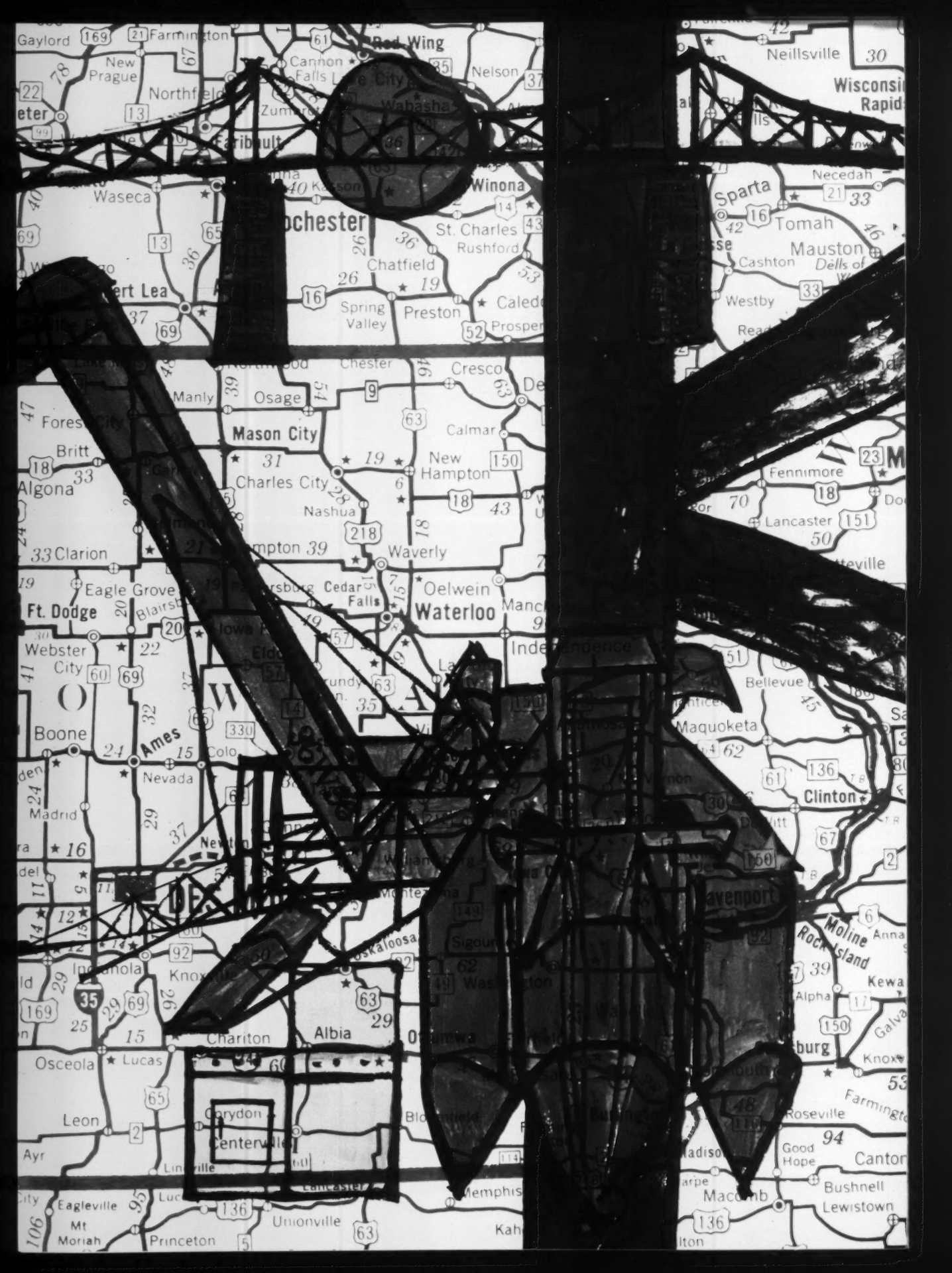
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New Hampton
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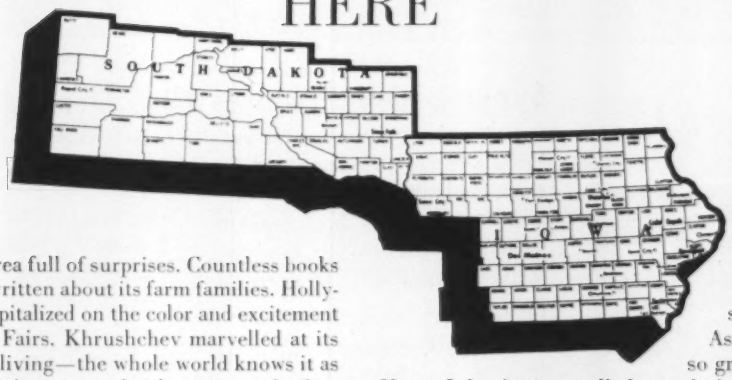

This is an area full of surprises. Countless books have been written about its farm families. Hollywood has capitalized on the color and excitement of its State Fairs. Khrushchev marvelled at its standard of living—the whole world knows it as one of the richest, most fertile areas on the face of the globe. But, what many do not know, is the dramatic industrial growth of this area—an amazing expansion of factories and products the value of which now actually exceeds that of its farm production!

Everywhere, one sees factory additions, huge new plants, great warehouses. From this land and its people come vast quantities of farm machinery and equipment—combines, corn pickers, planters, tillers, tractors, cribs, feeders and brooders. Great structural fabricating companies build bridges, homes, factories, skyscrapers. Famous-brand furnaces, food freezers, washing machines, dryers and home appliances go out to every state of the Union. Manufacturers of heavy duty industrial machinery, yard hoists, derricks, conveyors, pneumatic tools, lathes, graveling machines, road-building equipment, contribute to the wealth of the area and to our economy as a whole.

And everywhere, Inland Steel Company representatives find a hearty welcome. For Inland has served manufacturers in this area—Iowa, the southern half of South Dakota—and Rock Island County, Illinois—since 1893. As they grew, so grew Inland. Here, Inland men called regularly on every customer, large and small—maintained close personal relationships throughout the years—in times of plenty as well as in times of short supply.

The first orders ever received on Inland's books came from Iowa! Today, the original two Iowa customers, now significantly greater in size, continue their customer relationship with Inland.

Yes, Inland Steel is *here*. Here, because Inland enjoys the friendship of the people of this territory and the mutual respect that has developed over the years. Here, because here, is a vital part of Inland's future, too.

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INLAND

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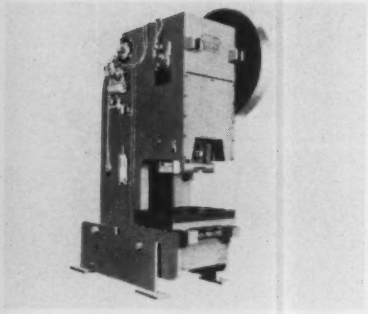
66 years of service to the Industrial Middle West

New Equipment and Machinery



Presses' Fabrication Includes Use of Steel Plate

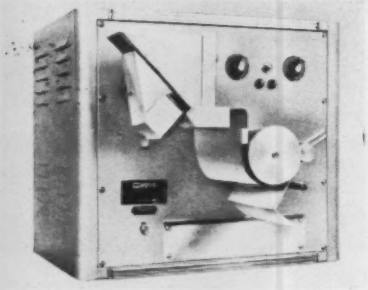
Advanced styling and reduced maintenance highlight a line of open-back inclinable presses. From 75- to 200-ton capacity, the entire line features welded-frame design and box-type slide—for greater production accuracy and more dependable barrel-type slide adjustment. Designed for a great variety of sheet-metal production operations, the presses permit free access of material from front to back and right to left. Each of the presses incline in three different positions, to accommodate various types of dies, and make use of gravity feed and discharge. (The Cleveland Punch & Shear Works Co.)

For more data circle No. 44 on postcard, p. 133

Superfinisher Features High Flexible Design

A general-purpose superfinisher has a simple bed—closed on three sides, but open on the front for easy access to the lubricating pump. Mounted on the bed are a headstock, a tailstock, and a vertical platen. Both the tailstock and the vertical platen are mounted in "T"-slots for easy positioning along the bed. Work is held between centers in a chuck, collet, or fixture, or supported on rollers. A second vertical platen can be added to this machine to permit superfinishing as many as four different areas at the same time. The machining cycle is completely automatic. (Gisholt Machine Co.)

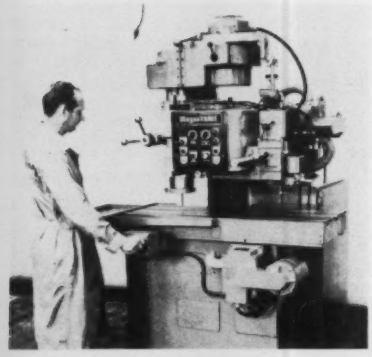
For more data circle No. 45 on postcard, p. 133



Separator Removes Magnetics From Materials

Handling feed rates up to 600 lb per hour, a laboratory magnetic separator comes with a vibrating feed hopper. The hopper is attached to a pan formed into a downward volute curve, which curtain feeds the material to be separated under a cylindrical stainless-steel housing. This housing contains permanent magnets rotating on a hub, in a direction counter to the downward fall of the material. This type unit removes magnetite and other highly magnetics from dry granulated materials. Flux may be adjusted to make differential low-intensity separations. (Carpco Mfg. Inc.)

For more data circle No. 46 on postcard, p. 133



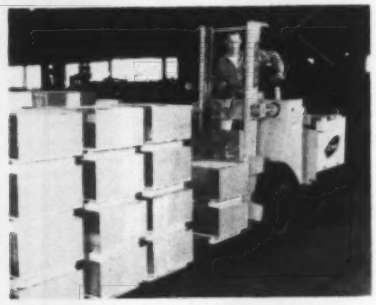
Automatic Profiler Offers High Accuracy

Specifically for 360° profile milling, an automatic profiler mills under tracer control. The machine operates by following an easily prepared sheet steel template with an extremely sensitive tracer stylus, the same size as the milling cutter. Complex, irregular, two-dimensional shapes can be reproduced with speeds and feeds and accuracy usually associated with precision plain milling operations. The machine contains a 5-hp spindle drive motor, with seven changes from 375 - 5200 rpm. Unusually - fast metal removal, with better finishes and increased cutter life, are results of the drive motor and the preset constant feed (up to 80 ipm), of the tracer along the template. (Pratt & Whitney Co., Inc.)

For more data circle No. 47 on postcard, p. 133

Fork Truck

Electrically - powered, a fork truck is equipped with a magnetic tin-plate clamp. The clamp securely grips the load of tin plate, and prevents slipping or tipping. Electro



magnets, mounted in the vertical legs of the forks, are energized as the load is picked up. Current is supplied from the truck's battery. (The Elwell-Parker Electric Co.)

For more data circle No. 48 on postcard, p. 133

Unit Vaporizes Metals

Remote-controlled, an electron beam evaporating unit vaporizes all metals, ceramics, refractory compounds and other non-metallics. The new unit is a remote-controlled electron beam gun that is suitable for installation in almost any laboratory or commercial vacuum equipment. It operates at 3×10^{-4} millimeters of mercury or lower. It may be used for either research and development, or volume production of thin-film coatings for microminiaturized electronic circuitry, optical filter films and similar applications where thin metallic or non-metallic coatings are desired. The unit also offers the advantage of higher deposition rates. (The Alloyd Corp.)

For more data circle No. 49 on postcard, p. 133

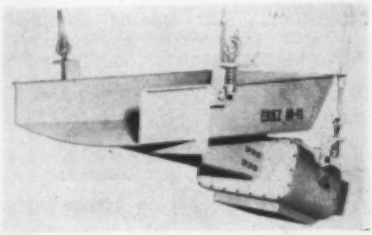
Electrodes

For consumers using ½-, ⅝- and ¾-in. electrodes in their work, these new electrodes fill the bill. The need for this item became apparent as higher current densities came into common use with these sizes. An accompanying thermal shock can cause spalling and splintering off of electrodes manufactured from other conventional materials. This problem has been eliminated with the new composition electrode. (Arcair Co.)

For more data circle No. 50 on postcard, p. 133

Vibratory Feeder

Of special interest to such industries as ceramics, rock products, mining and coal, a vibratory feeder handles a great diversity of materials in a wide range of particle sizes. It has a rated output of 75 tons per hour when operating level. This can be substantially increased



when the feeder is operated downslope. It is available as either a suspended or a base-mounted unit. The unit has an electro-permanent, magnetic drive system which operates directly from alternating current and needs no rectifier. The feeder can also be used for spread-

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the easy way with . . .
OWEN GRAPPLES
OWEN grapples act like a giant hand, with each finger or tine closing independently of the others. Because of this exclusive patented independent tine action, each tine does its full share . . . all four tines are always in contact with the material.
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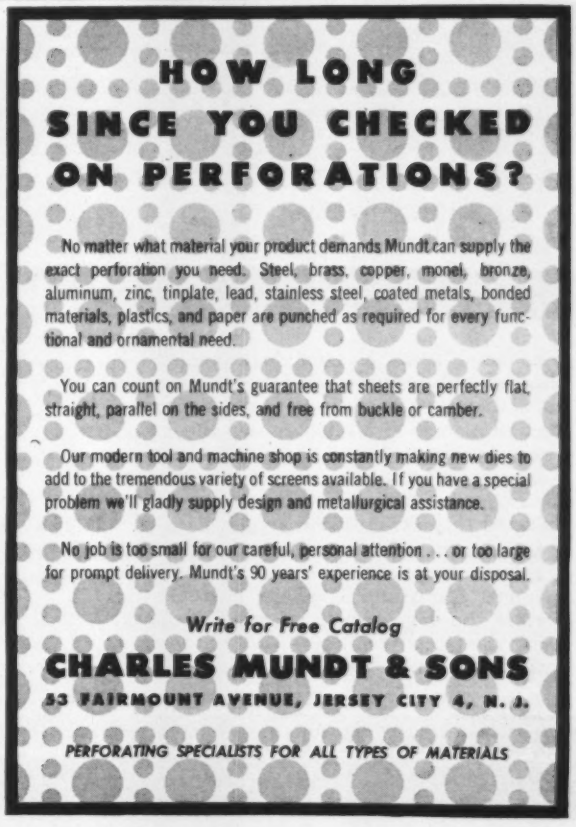
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No matter what material your product demands Mundt can supply the exact perforation you need. Steel, brass, copper, monel, bronze, aluminum, zinc, tinplate, lead, stainless steel, coated metals, bonded materials, plastics, and paper are punched as required for every functional and ornamental need.
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ing, drying, agitating and separating, and will move hot materials as well as moving materials into hot areas. (Eriez Mfg. Co.)

For more data circle No. 51 on postcard, p. 133

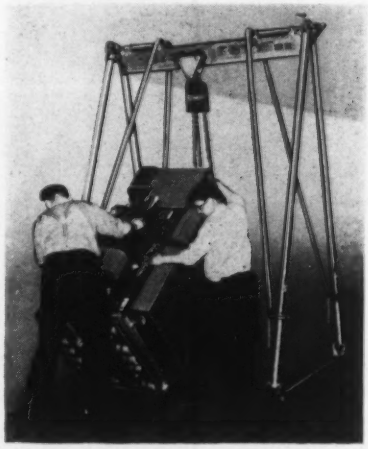
Laboratory Recorder

A new laboratory recorder has the sensitivity, speed, stability, and convenience that make it a perfect partner for recent chromatographic instruments, for tracing complex gas chromatograms. It will record temperature, monitor photocell output, and record any instrument reading that can be converted into dc millivolts in the recorder's range. (Fisher Scientific Co.)

For more data circle No. 52 on postcard, p. 133

Portable Gantry

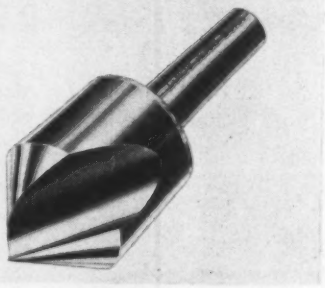
The problem of handling heavy equipment in cramped spaces led to the design of a portable gantry. It adjusts height, spread and level. The gantry has telescoping legs with up to 6 ft of height adjustment, and a self-aligning I-Beam that can be safely loaded from off center. The trolley is free to travel the full length. Other features include swivel lock casters, spring-loaded bolts, and removable casters and caster frames. All parts are weather proofed. It can be set low for moving under overhead obstacles, and narrowed to under 4 ft for rolling through tight spaces. At the job, it can be quickly raised to the exact height required. (B. E. Wallace Products Corp.)



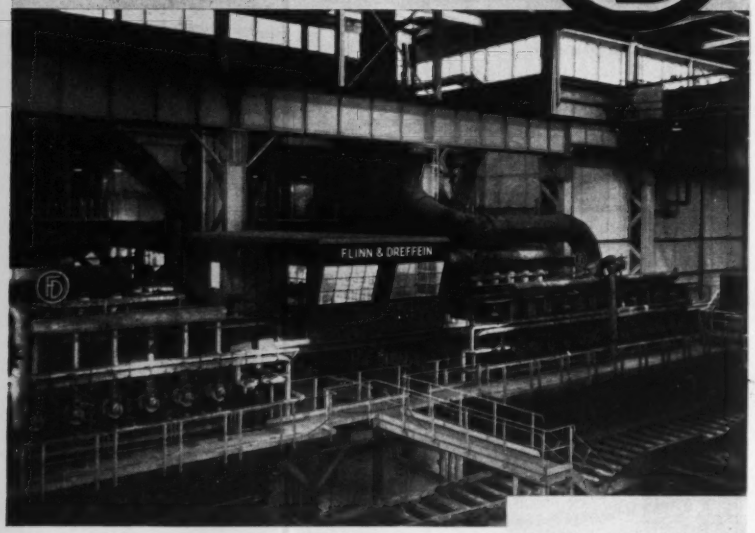
For more data circle No. 53 on postcard, p. 133

Tool Chamfers, Deburrs

A chamfering and deburring tool incorporates all the advantages of single-lip construction into a tool that has a truly new lip form. This new grind, on which there is a patent pending, enables industry for the first time to obtain a tool that will curl the chip up and away from the work. This completely eliminates forcing any metal into the edge of the opening or causing a ridge to be formed around the opening. Easy to regrind, the sharpening



. . . another first by Flinn & Dreffein . . .



Two new "Flinn & Dreffein Designed" 5-zone reheat furnaces made news recently when they were placed in operation at the new structural mill of United States Steel Corporation's South Works plant at Chicago.

The demand for larger sections, tonnage capacities and flexibility of heating operation dictated this advanced design.

Once again, Flinn and Dreffein experience and know-how reflected by user's confidence inspired Flinn and Dreffein engineers to further the development of reheat furnaces using the latest techniques and materials in furnace design.

F & D Furnaces . . . for more than half-a-century . . .

ANNEALING
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Gas and oil fired or electrically heated.

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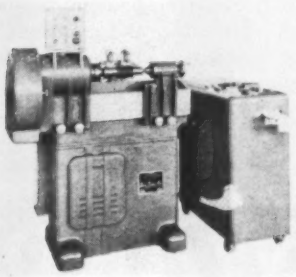
requires a minimum of equipment and time. It is made of vanadium alloys, quality controlled M-2 high-speed steel, hardened to exacting specifications and then treated to a special process that eliminates much of the galling common to all cutting tools. (Jancy Engineering Co.)

For more data circle No. 54 on postcard, p. 133

Lead Analyzer

A universal, precision lead analyzer can inspect and electronically record lead measurements on hobs, helical gears and splines, worms, screws, cams, taps, form milling cutters and multiple thread milling cutters. The tool or part to be checked is held between centers. A transducer head, mounted on a slide at the rear of the machine, contacts the helical surface and travels axially along the part while it is being

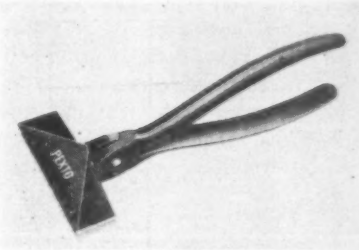


rotated. Any variations in the timed relationship between the part and slide are picked up by the transducer unit and amplified electronically. It is then charted on a separate amplifier-recorder unit. The lead analyzer can handle tools or parts up to 16-in. long and 9-in. diam. Maximum transducer slide travel is 8 in. Floor space of the machine is 30 in. x 44 in. Work height is 41½ in. (Star Cutter Co.)

For more data circle No. 55 on postcard, p. 133

Hand Seamer

Long a standard tool in the sheet-metal and allied industries, a hand seamer comes in two models. The tool features easy-set gages for precise and accurate crimping. The tool is also available without gages for application on a variety of changing operations, where speed is essential and ease of handling desirable. Both models are sturdily constructed of forged tool steel, to



give years of reliable, day-in and day-out service. Precision-machined crimping edges, vista-green finish and recognized quality construction are incorporated into both models of hand seamers. (The Peck, Stow & Wilcox Co.)

For more data circle No. 56 on postcard, p. 133

Code Marker

Consisting of a base, a cast "U"-shaped frame with upright to carry pneumatic equipment, a code-marking unit also includes an interchangeable die holder and fixed holder for product being marked.

*Localized Steel Service Centers can fulfill your steel requirements and eliminate the necessity for inplant inventory, thus releasing your investment in raw material and increasing your working capital.

Don't take chances trying to outguess supply and demand. Adequate stocks are maintained in a wide range of types, shapes and sizes. Delivery is *immediate*.

MICROROLD STAINLESS STEEL is regularly carried in stock by many of these independent steel warehouses. Washington Steel is a producer of stainless sheet and strip exclusively, all of which is precision rolled on Sendzimir mills.

WASHINGTON STEEL CORPORATION
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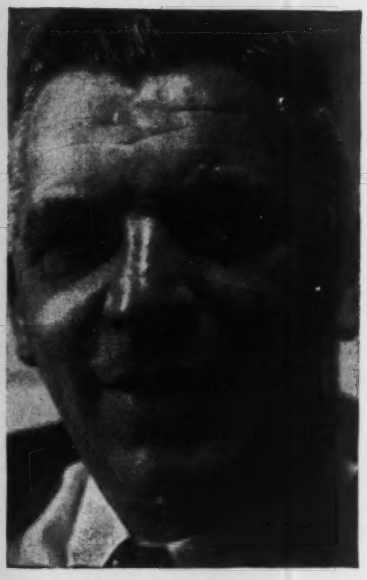
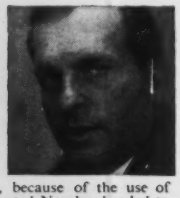


"at CRUCIBLE Steel Koppers Pressure-Treated Nozzles give us a higher control over teeming,"

says William Kollmann
Superintendent, Steel Production

At Crucible Steel's Midland, Pa., Works highest quality carbon, stainless and alloy steels are produced that are relatively free from entrapments and fallouts. That's because the electric furnace and open hearth teeming ladles are equipped with Koppers Pressure-Impregnated Nozzles. Crucible people feel that Koppers Nozzles contribute to cleaner and truer pours. No large runners, drippers or icicles develop —thermal spalling is minimized.



"Better pouring practice, because of the use of Koppers Pressure-Impregnated Nozzles, has led to improved ingot surface quality," *says Mr. E. R. Westfall, Open Hearth Superintendent.* (Left)

"After four years of continuous use, we're convinced Koppers Pressure-Impregnated Nozzles really help produce higher quality steels," *says Mr. R. Kelker, Electric Furnace Superintendent.* (Right)

FOR THE HOW AND WHY OF KOPPERS PRESSURE-IMPREGNATION OF NOZZLES

Write for Report No. KN-100. It evaluates Koppers pressure-impregnation of nozzles for electric furnace and open hearth steel production.

Refractories Dept., 792 Koppers Bldg., Pittsburgh 19, Pa.
R-3

KOPPERS
PRESSURE-IMPREGNATED
REFRACTORIES

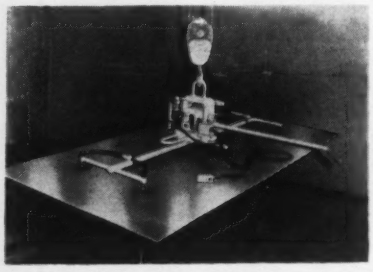
NEW EQUIPMENT

For code marking plastic, wood, metal and fiber parts or products, this small unit is both complete and fast. It places letters, numbers, symbols or other code markings on items that require an "unnoticeable" identification marking after manufacture. The outfit includes air filter, regulating valve for pressure, solenoid and quick exhaust. Size is about 6-in. wide x 12-in. high overall x 10-in. deep. It is intended for mounting singly or in series on a work bench. (The Acromark Co.)

For more data circle No. 57 on postcard, p. 133

Lifts Thin Sheets

A lifting unit handles and places very thin stainless-steel sheets on an insulating board. The new unit eliminates costly manual handling which produced crimping because of the lightness of material. This new lifting unit is entirely self-contained with the power pack mounted on a 48-in. beam, with three 20-in. crossarms attached. The six silicone pads have a total

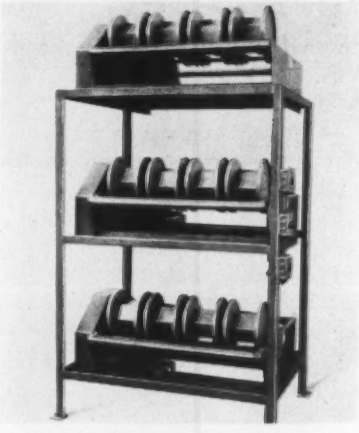


rated capacity of 300 lb with a 2:1 safety factor. Other features include push-button controls and a manual guide handle. The lift systems are currently used to handle materials from a few ounces to several tons. They are used extensively in handling steel plate, tanks, concrete, structural steel, glass, as well as many other nonporous materials. (The Siegler Corp.)

For more data circle No. 58 on postcard, p. 133

Finishing Machine

Compact and portable, a precision finishing machine for small-parts work processes four barrels at one time. It has 20- to 46-rpm variable-speed drive. Barrels are each 2-quart capacity, with orange "No-Seam" vinyl plastic lining. Powered by dual drive shafts, the machine has neoprene rollers in direct contact with each barrel flange. Belt and pulleys are safety-



enclosed. The machine has a wide variety of uses including lapidary work, deburring and polishing of delicate parts, sample lots, and special process applications. It measures 31-in. long x 38-in. deep

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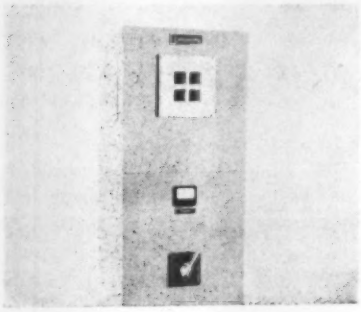
and 25¼-in. high. (Rampe Mfg. Co.)

For more data circle No. 59 on postcard, p. 133

Diffusion Furnace

Specifically designed for the semiconductor industry, a multi-tube diffusion furnace accommodates four rectangular refractory tubes. The tubes measure 2¼-in. wide x 2-in. high, enabling maximum production while occupying a mini-

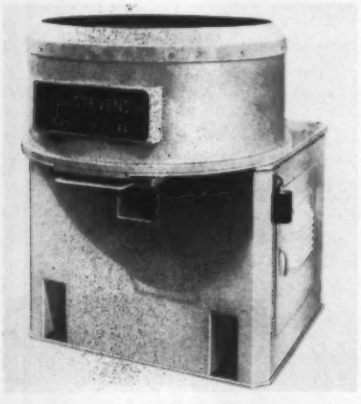


mum of floor space. The maximum continuous operating temperature is 1300°C. Uniform zone is 6-in. long at ±2.5°C. This is a compact unit completely assembled and ready for operation on connection to utilities. (Lindberg Engineering Co.)

For more data circle No. 60 on postcard, p. 133

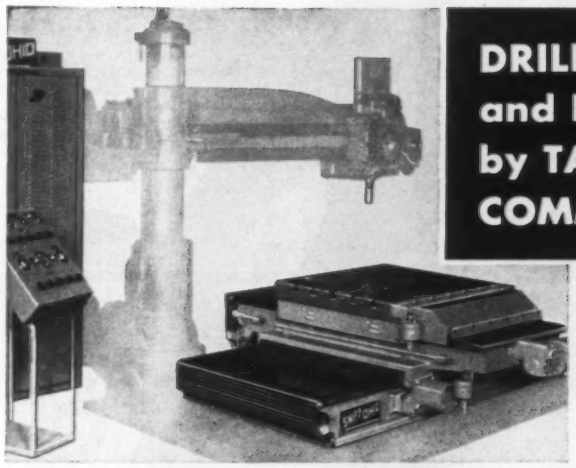
Sand Muller

Having a rated capacity of up to 400 lb, a sand muller is designed for batch mixing of sand with CO_2 binder, air-setting binders, resin binder, core oil and all other types of binders used in the production



of sand cores and molds. Outstanding features of the new muller are: A low silhouette; it is compact, fast, rugged, and maintenance free. (Frederick B. Stevens, Inc.)

For more data circle No. 61 on postcard, p. 133



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Looks like a steel freight savings of $1663.47

The owl-eyed steel shape pictured above is a 3½" gage shackle plate. It weighs 483 lbs. and was flame cut to special tolerances in one of Lukens' fabricating shops. A customer ordering 50 of these from—say—600 miles away would pay a freight charge of only $493.89 on the pieces.

However, if the same customer decided to flame cut the parts himself, 106,800 lbs. of 3½" gage steel plate stock would be required. Cost of shipment . . . $2157.36. Extra cost to the customer on freight alone . . . $1663.47. *Plus* . . . the expense of his equipment investment . . . the tie-up of his capital in plate stock . . . the cost of handling 75% scrap . . . the problem of shop spoilage.

Moral: Don't pay freight on scrap. Contact Lukens for Steel Plate Shapes Service . . . flame cutting, shearing, blanking, bending, pressing, welding—of carbon and alloy plate produced on our own rolling mills. Call or write Fabrication Building, Lukens Steel Company, Coatesville, Pennsylvania. Address Dept. A-60.

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A-60 Fabrication Building
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Please send me your free booklet on Steel Plates Shapes.

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The Iron Age Summary

No Upturn Before Mid-August

Steelmakers are pinning their hopes of a comback on automotive buying and the end of inventory control.

But no significant change is likely until August. July has been written off.

■ Steelmakers have virtually written off the month of July. The rate of new orders coming in is still less than 50 pct (as measured against capacity). This means a dismal next month.

The industry is now looking to automakers as the hope of any significant uptrend later in August. Some steel orders are now in for August delivery, indicating an improvement in steelmaking operations then.

Big October—Auto production will begin in late summer with October now expected to be the big month. An optimistic 685,000 cars are now scheduled. This would make it the biggest October in history.

But there is some doubt if automakers will reach that ambitious goal. Steelmakers have been told that production may not rise as rapidly to peak rates on 1961 cars as has been the historical precedent.

Sales Scrutinized—There is no question but that automakers will keep a close eye on reception of their 1961 cars. They will be flexible to adjust either way. A lot now depends on inventory cleanup of unsold 1960's. The industry hopes to build out to the extent that about 350,000 of the 1960's remain when new model production starts.

Aside from automotive hopes, the steel industry has nothing to cheer about. The poor rate of new business will only be aggravated by seasonal slowdowns and vacations.

Inventories Again—This will delay further progress in inventory control. Most of the industry is resigned to no major improvement until users have cut their stocks of steel to the limit.

Among the products, flat-rolled have held up best. This is because of the continued high automotive use, added to by an unexpected surge in exports. While the export business of cold-rolled sheets is widespread, it is most noticeable in the Midwest, where three mills are exporting about 36,000 tons a month through the St. Lawrence Seaway.

Destination of most export steel is to Europe's booming auto industry where wide sheets with deep-drawing quality are in demand.

One major mill reports its July bookings of cold-rolled sheet are better than 80 pct of capacity.

Earnings Picture—The fact that flat-rolled products have held up well (comparatively) is keeping the industry's earnings picture from looking as bad as might be expected. These are comparatively high-profit items and good sales will keep earnings in a better position than the overall rate of business might indicate.

But there is another side to the picture, particularly to mills heavily involved with oil country goods and stainless. The dropoff in seamless hurts, as does the poor rate of stainless and specialty steel business.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,739	1,775	1,870	2,486
Ingot Index				
(1947-1949=100)	108.3	110.5	116.4	154.8
Operating Rates				
North East Coast	69.0	69.0	72.0	94.0
Buffalo	59.0	60.0*	73.0	91.0
Pittsburgh	59.0	60.0	70.0	84.0
Youngstown	44.0	42.0*	40.0	84.0
Cleveland	58.0	66.0*	69.0	91.0
Detroit	80.0	82.0*	72.0	97.0
Chicago	63.0	64.0*	72.0	89.0
Cincinnati	60.0	63.0*	52.0	82.0
St. Louis	72.0	74.0*	79.0	101.0
South	63.0	65.0*	54.0	87.0
West	63.0	69.0*	67.0	90.0
U. S. Rate	61.0	62.3	65.6	87.8

*Revised
Source: American Iron and Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$31.00	$31.50	$32.50	$38.17
No. 2 bundles	$20.83	$20.83	$22.17	$25.50
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	31.50
Lead, St. Louis	11.80	11.80	11.80	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	101.50	101.25	99.625	103.50
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

Purchasing Is a Two-Way Street

What's good for the buyer should also benefit the seller, says W. A. Ehresman, director of purchases, The Budd Co.

He applies this creed to purchases which totaled about $150,000,000 last year.

■ How much interest should the buyer take in the seller's problems? Does the "golden rule" approach to purchasing really pay off for the buyer?

William A. Ehresman, director of purchases for The Budd Co., Philadelphia, believes it does. His buying philosophy is summed up when he says, "Purchasing should be for the mutual interest of the buyer and the seller."

Mr. Ehresman uses this approach in buying for Budd—purchases which totaled about $150,000,000 last year. As director of purchases, he supervises the work of a staff of almost 100. The group does the buying for six of Budd's 11 plants, handling about 40,000 items a year.

Wide Product Range—Budd's interests are diversified, including auto bodies, wheels, assemblies, stampings, railroad cars and equipment, instruments and controls, nuclear and space design and engineering, and foundry equipment.

At Budd, the purchasing operation is primarily "decentralized." Inventories are set by the production department at each plant with the plant manager's approval. The plant's P. A. places purchase orders.

Steel Orders Reviewed — These are reviewed by Mr. Ehresman and his central staff at Philadelphia. But only in two cases does Philadelphia assume full control of the buying.

"We determine which steel mills will supply what per cent of our metal needs and whether the material will be shipped by rail or truck," says Mr. Ehresman. "In addition," he adds, "we influence the purchase of capital equipment—such as presses and welders. The prime objective here is standardization. There is no point in buying a machine which can be used at only one plant or under fixed conditions."

Where is the steel bought?

"Basically, in regard to the mill's geographic location and its product and size limitations," he says.

As a general policy, Budd does not purchase service center steel for production use. The company buys only from established mill suppliers despite the condition of the market. And it does not believe in buying foreign steel.

Four-Wall Inventory — Budd maintains a four-wall inventory of production items, which includes all material in stock or in process. The production rate determines how much inventory is stocked.

Views on EDP—Budd is interested in the use of data processing equipment for inventory control and is now studying its application "Its use will probably eliminate error," Mr. Ehresman comments, "and speed up the time needed to adapt buying to changes in output. By providing better information faster it will help us do a more thorough job." But he strongly doubts data processing can completely solve the problem of excessive inventory buildups or shortages.

W. A. EHRESMAN: Benefits for both buyer and seller.

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TO: T.R. Williams, Sales Manager

FROM: David Gentry, Midwest Rep.

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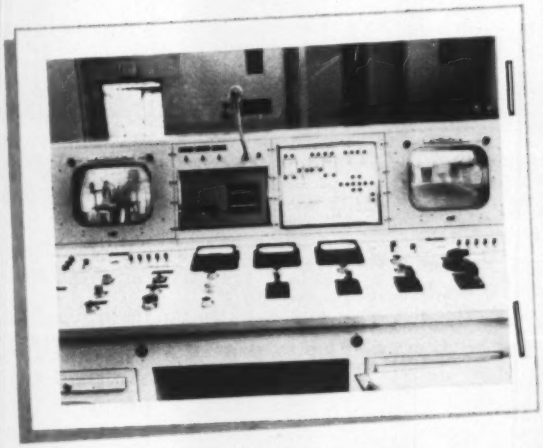

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W4

Mill Inventories Speed Delivery

It's costly, but mills have built up inventories of finished and semi-finished steel.

Customers are placing orders with the mills that promise the fastest delivery.

■ One of the most critical problems facing steelmakers is in their own inventory.t The problem: To wha extent will mills carry inventories of finished and semi-finished steel.

The problem is brought about by customer demand for emergency delivery to fill their own inventory gaps. The importance of in-plant inventory depends on product, but most mills will admit they have built in-plant inventories to furnish fast delivery.

Stainless producers are probably in the lead in stocking finished products; sheet producers probably much less extended, although some sheet makers concede they are stocking cold-rolled.

Service Is Expensive—The most economic state to build inventories is in the slab, but this involves a long finishing cycle. But some sheet makers are storing stocks of hot-bands, which require less time to finish, but involve other problems that can be costly.

One stainless and specialty producer says use of a computer enabled it to cut its inventories by a significant 25 pct. This points out the extent to which inventories are being scrutinized as never before in mill attempts to provide service, but keep cost of possession at a minimum.

Sheet and Strip—Based on current production, sheet business is still fairly good in **Pittsburgh.** But there's no doubt that business will go down before it goes up. Auto commitments will reach the low point in July. Mills in **Cleveland** report a similar situation, but there is one additional factor in their favor—export. European automakers are buying steel from three mills in the district. Steel is going to England, Sweden, Germany, and other countries. In addition to wide sheets, some pipe and skelp is also being exported. One mill is making export tonnage for the first time in recent years—a premium sheet with a fine grain and deep drawing quality. Orders for August are picking up in **Detroit.** It's beginning to look as though the month will be fair to good. And September should be considerably better. But steelmakers are only guessing at what to expect from other large users such as appliance makers.

Tinplate—Recent price cuts for thin gages of tinplate, announced by U. S. Steel Corp., indicate that tinplate producers aren't going to lose the lightweight can market by default. Recent developments in aluminum can making may have forced U. S. Steel to move sooner than expected, but the fact it did move is significant. It means that aluminum producers have been successful in selling their product for containers; or at least enough so that they can no longer be ignored. It also means that development of new thin tinplates is close at hand.

Effective June 21, U. S. Steel Supply Div. revised item and order extras as well as base price on hot-rolled products in Chicago, Cleveland and Pittsburgh.

Changes varied, but net effect is to reduce prices. The move was made to meet competition and follows recent price changes by other warehouses.

Pipe and Tubing—The present market for oil country goods is dismal and the outlook has little promise of better things. Mills have stocked their down-river depots to the limit and will provide 24-hour delivery to almost any field. Export market for oil country products is considered dead, and imports of some products are adding to the problem. Domestic drilling is at a low rate because of surpluses and little improvement is indicated. By comparison, the year will be a good one for linepipe. However, tonnage will fall short of past peaks. New foreign capacity is pushing domestic mills out of the big Canadian and Middle East markets.

Wire—Manufacturers wire is being sold on a day-to-day basis. Large stocks are available for immediate delivery. Producers in **Pittsburgh** can fill most orders in less than three days.

Structurals and Plate—Structural mills continue to run at a near-capacity rate in **Chicago.** But plate is beginning to soften. To keep up the rolling rate, mills are pushing plate orders through as soon as they come in, or as soon as the customer is willing to take delivery. Delivery has been made within 24 hours of the time the order was placed. Mills are also asking to ship August tonnage now. With mills offering such fast delivery, fabricators are buying less than normal from warehouses.

Stainless—Pickup in demand will have to wait for 1961 model cars. A week ago there was still some shopping around in **Detroit** for June material. Getting the order still depends on how soon it can be delivered. Order books are still wide open for July and August, and will likely remain that way.

COMPARISON OF PRICES

(Effective June 21, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	June 21 1960	June 14 1960	May 24 1960	June 23 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.60	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Bas price	6.196¢	6.196¢	6.196¢	6.196¢

	June 21 1960	June 14 1960	May 24 1960	June 23 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, South Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$30.50*	$31.50	$33.50	$42.50
No. 1 steel, Phila. area	33.50	33.50	34.50	37.50
No. 1 steel, Chicago	29.00*	29.50	29.50	34.50
No. 1 bundles, Detroit	27.50	27.50	29.50	35.50
Low phos., Youngstown	34.50	34.50	36.50	42.50
No. 1 mach'y cast, Pittsburgh	49.50	49.50	50.50	50.50
No. 1 mach'y cast, Phila.	51.50	51.50	51.50	49.50
No. 1 mach'y cast, Chicago	45.50*	46.50	50.50	58.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$31.00*	$31.50	$32.50	$38.17
No. 2 bundles	20.83	20.83	22.17	25.50
Coke Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin, Straits, N. Y.	101.50	101.25	99.625	103.50
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	11.80
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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* Appears in the June 16 and June 30 issues.

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No Near Relief Seen for Market

Dull market lingers as only exports show life. Domestic market expected to stay sluggish as factories get set for July shutdowns.

The lack of activity has talk of lower prices alive.

■ Scrap men see little hope for a favorable break in the market in the near future. Forecasts of a turn in the road range from late July to "sometime in September."

Vacation Shutdowns—On top of present low demand, brokers and dealers are getting notices of mill vacation shutdowns in July. And business doesn't seem to be getting any better for scrap-buying firms.

Exports remain generally firm at the Coast cities and there is hopeful talk that this market will remain firm or even expand. But there is also concern over the present U.S.-Japanese diplomatic stress and the effect it could possibly have on exports to Japan.

Pittsburgh — The market continues to look weaker, reflecting a shrinking of demand rather than the availability of any tonnage at lower prices. Shipments of old orders into one mill have been stopped. Another mill has completed it's program for the month. One regular buyer is said to be virtually out of the market. The lack of activity has stirred talk of lower prices.

Chicago—Movement in this area is at a virtual standstill. Brokers report a dropoff in industrial scrap generation to about 60 pct of normal for the period, with collections still falling. Railroads are laying down scrap. Foundry prices continue to drift downward, along with blast furnace grades, though the lower prices are based on very small purchases.

Philadelphia—Only exports show much activity. It is reported that in some cases freight rates are being adjusted to absorb the local terminal charge. There is no price change reported and openhearth grades. Export is going for $2 to $3 a ton over domestic prices in this area.

New York—There is some disagreement on the firmness of the market this week. One dealer says export demand is improved, and that he is pretty well set for the summer. Another says that export demand is holding, but barely. The consensus is that export demand is strong enough so that there is little immediate threat to the current prices.

Detroit—There are no reports of sales of dealer scrap. The last order was made a couple weeks ago by a mill for No. 2 dealer bundles. A small quantity went for $19 delivered. An auto company foundry last week reportedly sold some 2,000 tons of frame stock and punchings and plate for just under $26. It looks as if industrial list tonnage in the area for July will be 20 to 30 pct lower than June, with August dropping lower.

Cleveland—Production and railroad scrap are about the only grades moving in a sluggish market. Mills are just not interested at the present rate of operations. Some will not take single cars of distress tonnage. Dealers are taking in only tonnage they have to from contract commitments.

St. Louis — A strictly buyer's market continues to exist in this area. Prices, mostly unchanged, show weak undertones. Purchases that are being made are for small tonnage. No relief from the present listless state is seen until August or September.

Cincinnati — Sparse orders are being slowly filled with distress tonnage. And mills and brokers don't want it bad enough to raise prices. Source are starting to dry up because of price.

Birmingham — Some foundry scrap is moving in small quantities in this district, but openhearth, electric furnace and cast consumers are out of the market and exports are quiet. Dealers report scrap is coming into the yards slowly and they are beginning to accumulate inventories, especially in openhearth grades.

Buffalo—Only activity reported here in small sales of cast as quoted. Dealers are shipping against first of month orders. Only three vessels have brought scrap into Buffalo thus far this season.

Boston — The market is unchanged from the pattern of recent months: A small trickle of domestic business and some export. Prices are unchanged, but machine shop turnings could not move at any price.

West Coast—In San Francisco, Los Angeles and Seattle, the domestic market remains on dead center. Exporting is practically the only business going on. The trade looks for a dull July.

Houston — The market outlook has dimmed considerably as a district mill announces it will cancel all outstanding orders after June 30. A mill in East Texas says it will not be in the market during July. Export to Japan and Mexico is providing the only starch in the market since foundry activity has also declined.

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At Gary Steel Supply Co., Chicago, Acme Idea Man Art Hartley (left) views Idea No. S4-11.

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SCRAP PRICES

(Effective June 21, 1960)

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	36.00 to 37.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 18.00
Low phos. punch'gs plate	38.00 to 39.00
Heavy turnings	27.00 to 28.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	47.00 to 48.00
Rails 2 ft. and under	52.00 to 53.00
RR specialties	46.00 to 47.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	40.00 to 41.00
Stainless	
18-8 bundles and solids	195.00 to 200.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	105.00 to 110.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$28.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	28.00 to 30.00
No. 1 factory bundles	34.00 to 35.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Low phos. forge crops	40.00 to 41.00
Low phos. punch'gs plate, ¼ in. and heavier	34.00 to 35.00
Low phos. 2 ft. and under	32.00 to 33.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	41.00 to 42.00
Rerolling rails	49.00 to 50.00
Rails 2 ft. and under	48.00 to 49.00
Angles and splice bars	41.00 to 42.00
RR steel car axles	47.00 to 48.00
RR couplers and knuckles	38.00 to 39.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	40.00 to 41.00
Cast iron wheels	31.00 to 32.00
Malleable	43.00 to 44.00
Stove plate	34.00 to 35.00
Steel car wheels	37.00 to 38.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	85.00 to 90.00
430 bundles and solids	85.00 to 90.00
430 turnings	40.00 to 50.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy melting	29.00 to 30.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	25.00 to 26.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. 2 ft punch'gs	39.00 to 40.00
Elec. furnace bundles	36.00 to 37.00
Heavy turnings	27.00 to 28.00
RR specialties	39.00 to 40.00
Rails, 18 in. and under	56.00 to 57.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	42.00 to 43.00
Malleable	50.00 to 51.00
No. 1 machinery cast.	51.00 to 52.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.50 to $27.50
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	26.50 to 27.50
No. 2 bundles	17.00 to 18.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Low phos. 18 in. and under	33.00 to 34.00
Rails, random length	45.00 to 46.00
Rails, 18 in. and under	51.00 to 52.00
No. 1 cupola cast.	36.00 to 37.00
Hvy. breakable cast.	33.00 to 34.00
Drop broken cast.	47.00 to 48.00

Youngstown

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	34.00 to 35.00

Cleveland

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	30.00 to 31.00
No. 1 factory bundles	33.00 to 34.00
No. 2 bundles	18.00 to 19.00
No. 1. busheling	30.00 to 31.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	36.00 to 37.00
Drop forge flashings	30.00 to 31.00
Low phos. punch'gs plate	31.00 to 32.00
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	33.00 to 34.00
Rails 2 ft. and under	49.00 to 50.00
Rails 18 in. and under	50.00 to 51.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	47.00 to 48.00
No. 1 machinery cast.	50.00 to 51.00
Stove plate	39.00 to 40.00
Malleable	47.00 to 48.00
Stainless	
18-8 bundles	190.00 to 195.00
18-8 turnings	85.00 to 90.00
430 bundles	90.00 to 95.00

Buffalo

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 busheling	30.00 to 31.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	16.00 to 17.00
Low phos, plate	40.00 to 41.00
Structurals and plate, 2 ft and under	40.00 to 41.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	46.00 to 47.00
No. 1 cupola cast.	42.00 to 43.00

St. Louis

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	28.00 to 29.00
Foundry steel, 2 ft	31.00 to 32.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	18.00 to 19.00
No. 1 RR hvy. melting	31.00 to 32.00
Rails, random lengths	37.00 to 38.00
Rails, 18 in. and under	41.00 to 42.00
RR specialties	38.00 to 39.00
Cupola cast.	43.00 to 44.00
Heavy breakable cast.	33.00 to 34.00
Stove plate	36.00 to 37.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	47.00 to 48.00
Unstripped motor blocks	36.00 to 37.00

Birmingham

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	32.00 to 33.00
Elec. furnace, 3 ft & under	32.00 to 33.00
Bar crops and plate	37.00 to 38.00
Structural and plate, 2 ft.	36.00 to 37.00
No. 1 RR hvy. melting	28.00 to 29.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	39.00 to 40.00
No. 1 cupola cast.	47.00 to 48.00
Stove plate	48.00 to 49.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	37.00 to 38.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings	20.00 to 21.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	175.00 to 180.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $25.00
No. 2 hvy. melting	15.00 to 16.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	24.00 to 25.00
Drop forge flashings	24.00 to 25.00
Machine shop turn.	8.00 to 9.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	11.00 to 12.00
Cast iron borings	11.00 to 12.00
Heavy breakable cast.	29.00 to 30.00
Mixed cupola cast.	33.00 to 34.00
Automotive cast.	42.00 to 43.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	60.00 to 65.00
430 bundles and solids	60.00 to 65.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $24.50
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.00 to 24.50
No. 2 bundles	14.00 to 15.00
No. 1 busheling	24.00 to 24.50
Machine shop turn.	5.00 to 6.00
Shoveling turnings	7.50 to 8.50
Clean cast. chem. borings	13.00 to 14.00
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	27.00 to 28.00

San Francisco

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	30.00
No. 2 bundles	20.00
Machine shop turn.	$14.00 to 15.00
Cast iron borings	14.00 to 15.00
No. 1 cupola cast.	46.00

Los Angeles

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	27.00
No. 2 bundles	17.00
Machine shop turn	15.00
Shoveling turnings	15.00
Cast iron borings	$15.00 to 16.00
Elec. furn. 1 ft and under (foundry)	42.00 to 43.00
No. 1 cupola cast.	42.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

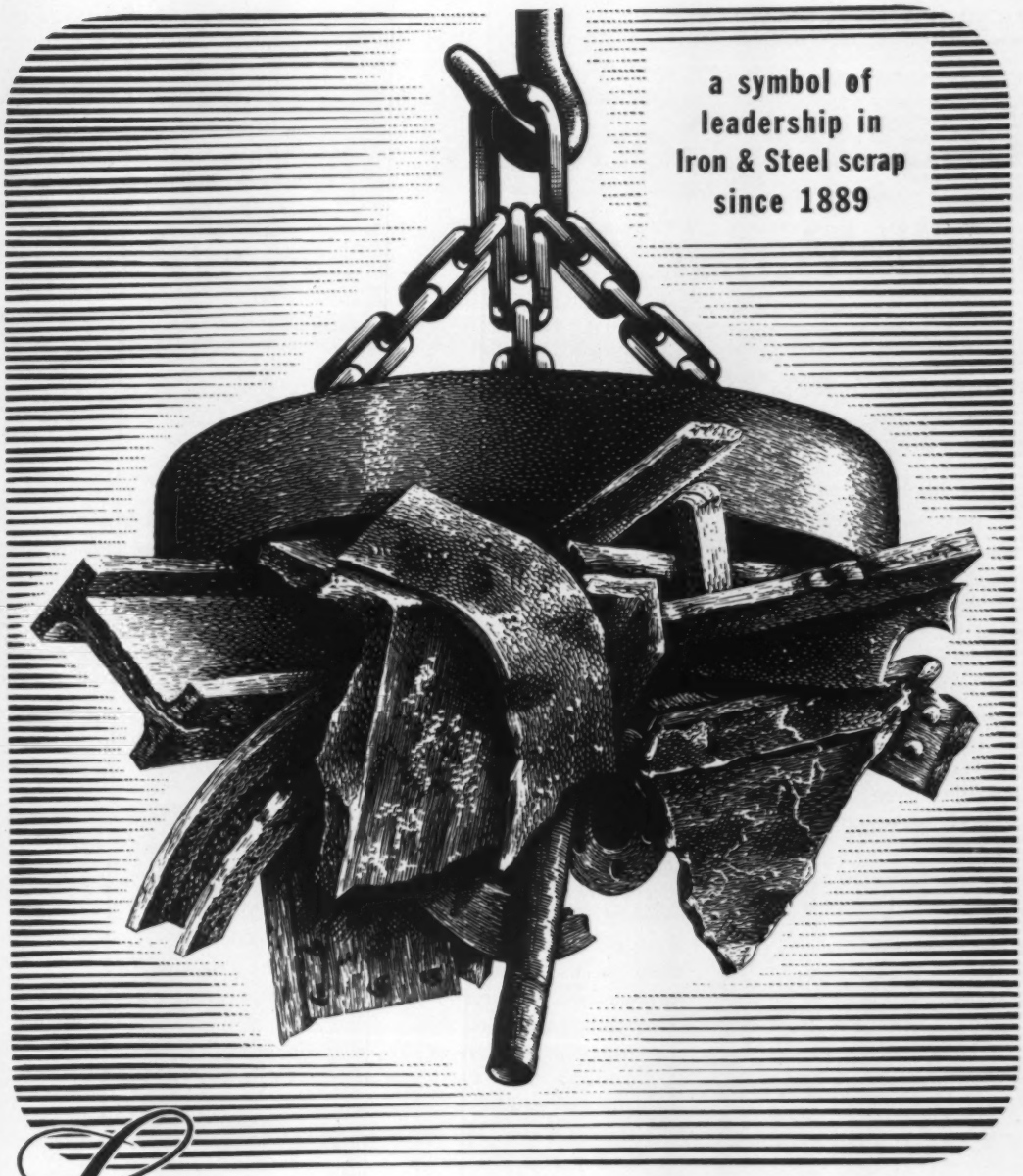
Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$25.80
No. 2 hvy. melting, 2 ft. and under	25.50
No. 1 dealer bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bush., new fact., prep'd	25.50
Bush., new fact., unprep'd	20.45
Machine shop turn.	12.00
Short steel turn.	12.00
Mixed bor. and turn	12.00
Cast scrap	33.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	19.00
Machine shop turn.	12.00
Shoveling turnings	14.00
Cut structural plate 2 ft & under	$40.00 to 41.00
Unstripped motor blocks	28.00 to 29.00
Cupola cast.	33.00 to 34.00
Heavy breakable cast.	25.00 to 26.00



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Congress Debates Small Miner Aid

Against the odds, a bill to aid small lead and zinc miners gets to the House floor.

But it is likely to end there. Even if passed, a Presidential veto would be likely.

▪ Small domestic lead and zinc miners don't discourage easily. Their persistence has carried them closer to getting some relief from the pressure of low-priced imports than ever before.

But probably to little avail. The general feeling in the trade is that they will go away empty-handed again this year.

There are apparently still too many obstacles and too little time.

Out of Committee—In a surprising move, the House Rules Committee cleared, by a vote of 7 to 5, the controversial bill calling for subsidies for U. S. lead and zinc miners who produce less than 2000 tons of ore annually.

This in itself is a moral victory. Just a few weeks ago, the Rules Committee deadlocked at 6 to 6, halting the progress of the bill. Many considered the issue dead then.

The word from Washington, when the new vote of the Rules Committee changed the picture, was that the bill would likely reach the floor of the House early this week.

What Chance?—Amendments were expected. First of all, some of the bill's strongest supporters in industry are miners whose output exceeds the 2000-ton limit. They are pressing their Congressmen to revise this upward. Also, indications were that some opponents would try to weigh the bill down with amendments to discourage the uncommitted Congressmen from approving it.

This bill has a better chance to pass than previous attempts at legislation aimed at helping domestic lead and zinc miners. One reason is that it helps only the small operators. The larger companies, which have been turning some profit even in the face of foreign competition, don't stand to profit at all.

Working Against—But there still appears to be too much working against it. For one thing, the Emergency Lead-Zinc Committee, voice of the domestic industry in Washington, has been and will be silent on this issue. Some of its members are the larger companies, which still contend subsidies are not the answer. In the face of this split in the membership, the Committee has remained neutral.

Also, the Senate has not moved on the duplicate bill. Some in the industry say they have "more friends proportionately in the Senate than in the House" and that the Senate could move very rapidly. But time is running out.

Rush to Adjourn—On Capitol Hill, adjournment fever has definitely set in. And it is stronger this year because of the impending political conventions.

Congress will try to wind up its business by July 5 or 6. In this case the lead-zinc bill would be near the bottom of the legislation priority list.

The Provisions — And the Administration is opposed to this bill. Even if the bill makes it through both houses of Congress, there is a better than even chance the President would veto or pocket it.

The bill reported out by the House Rules Committee calls for subsidies to miners producing less than 2000 tons of ore a year, when the price of lead on the U. S. market drops below 17¢ per lb, and zinc below 14½¢ per lb. It is a five-year, emergency program, with subsidies limited to $4.84 million per year.

Copper

Business isn't much better for the brass mills now than it has been for the last two to three months. However, the mills aren't entirely discouraged.

"Considering all the things working against us, we're not doing too badly," said the head of one major mill. But sees little or no change in the market until the pickup he expects late in August.

Some mills suggest there is some slight improvement starting now.

Tin prices for the week. June 15—101.25; June 16—101.375; June 17—101.625; June 20—101.50*; June 21—101.50*.

* Estimate.

Primary Prices

cents per lb	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.58	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = cutom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 155.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("P" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size"	¼	⅜-½	⅝-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bs.	56.17	56.46	55.86	59.48
Mang. Bs.	58.86	.....	52.31	.....
Phos. Bs. 5%	77.44	.....	78.12	.....

Free Cutting Brass Rod 36.96

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base ..... $ 1.31
Cobalt, 97-99% (per lb) ..... $1.50 to $1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95 to 36.95
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9%, dollars per troy oz.. $2.25
Iridium, dollars per troy oz. ..... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $210 to $212
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz.. $24 to $26
Platinum, dollars per troy oz.. $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 29.25
- No. 120 ..... 28.25
- No. 123 ..... 27.25

80-10-10 ingot
- No. 305 ..... 33.75
- No. 315 ..... 31.50

88-10-2 ingot
- No. 210 ..... 42.00
- No. 215 ..... 38.75
- No. 245 ..... 34.00

Yellow ingot
- No. 405 ..... 23.75

Manganese bronze
- No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.75-26.00
- 0.60 copper max. 25.50-25.75

Piston alloys (No. 132 type) ... 28.00-29.00
No. 12 alum. (No. 2 grade) ... 24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.) ... 25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

(Effective June 21, 1960)

Steel deoxidizing aluminum notch bar granulated or shot
Grade 1—95-97½% 25.25-26.25
Grade 2—92-95% 24.00-25.00
Grade 3—90-92% 23.00-24.00
Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26½
No. 2 copper wire 24½
Light copper 22¼
*Refinery brass 22½
Copper bearing material 21½
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¾
No. 2 copper wire 24
Light copper 21¾
No. 1 composition 20½
No. 1 comp. turnings 20
Hvy. yellow brass solids 15
Brass pipe 14
Radiators 16

Aluminum

Mixed old cast. ..... 13½—14
Mixed new clips ..... 15 —15½
Mixed turnings, dry ..... 14 —14½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 22¾—23
No. 2 copper wire ..... 20½—21
Light copper ..... 18½—19
Auto radiators (unsweated) .. 12½—13
No. 1 composition ..... 17 —17½
No. 1 composition turnings... 15½—16
Cocks and faucets ..... 13 —13½
Clean heavy yellow brass ... 11¾—12¼
Brass pipe ..... 13½—14
New soft brass clippings .... 14 —14½
No. 1 brass rod turnings .... 11½—12

Aluminum

Alum. pistons and struts .... 7½— 8
Aluminum crankcase ..... 11¼—11¾
1100 (2s) aluminum clippings 15 —15½
Old sheet and utensils ..... 11¼—11¾
Borings and turnings ..... 7 — 7½
Industrial castings ..... 11¼—11¾
2020 (24S) clippings ..... 12½—13

Zinc

New zinc clippings ..... 7 — 7¼
Old zinc ..... 4½— 5
Zinc routings ..... 3¼— 3½
Old die cast scrap ..... 2¾— 3

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 28-29
Clean Monel turnings 20-23
Old sheet Monel 24-26
Nickel silver clippings, mixed 18
Nickel silver turnings, mixed 15

Lead

Soft scrap lead ..... 8 — 8¼
Battery plates (dry) ..... 3 — 3¼
Batteries, acid free ..... 2 — 2¼

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 55 —56
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 9¾—10¼
Solder joints ..... 13¼—13¾
Siphon tops 41
Small foundry type ..... 9¾—10¼
Monotype ..... 9¾—10¼
Lino. and stereotype ..... 8¾— 9
Electrotype ..... 7½— 7¾
Hand picked type shells .... 5¼— 5¾
Lino. and stereo. dross ..... 2¼— 2¾
Electro dross ..... 2¼— 2¾

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Castle, Pa.									7.425* *M8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, I3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective June 20, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Coke* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.825 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.825 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective June 20, 1960)

**7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective June 20, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore**	$.10	8.37	9.71	10.16	10.78	8.94	9.63	9.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	.....	.....	.....
Boston**	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	9.15	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.89	10.35	11.10	10.55	8.82	9.48	8.99	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	9.06	10.41	11.10	10.87	9.20	10.04	9.31	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	9.15	10.61	11.45	10.92	9.19	10.04	9.30	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	9.65	12.19[3]	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.59[1]	11.29	12.20	11.29	9.82	10.54	9.67	14.20	18.30	17.35	22.90	22.20
Memphis**	.15	9.99	10.20	.....	11.39	10.27	10.48	10.07	12.89	.....	.....	.....	.....
Milwaukee**	.15	9.03	10.49	11.24	10.69	8.96	9.70	9.13	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	16.16	16.50	20.10	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia**	.10	8.95	9.70	10.76	10.95	9.30	9.95	9.35	12.05	17.48	16.48	21.68	20.33
Pittsburgh**	.15	8.58	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland**		10.20	12.05	12.35	12.20	10.35	10.80	10.20	16.65	18.50	17.45	20.75	20.25
San Francisco**	.10	10.27	11.79[2]	11.55	11.88	10.48	10.50	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**		10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.99	10.75	11.48	10.65	8.93	9.60	9.10	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	9.15	9.74	10.89	10.81	9.10	9.78	9.27	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¼" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅜-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅜" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective June 20, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
Sc. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

* Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

f.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective June 20, 1960)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	31.75 48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	43.75	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* wenasboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	.....	212	193	9.00	9.55
Aliquippa *J3****	173	190	.....	.....	190	9.00	9.675
Atlanta *A8***	175	193	.....	214	199	9.10	9.85
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	193	.....	214	199	9.10	9.85‡
Donora, Pa. *A5*	173	187	.....	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	.....	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	.....	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	.....	219	203	9.10	9.775
Johnstown *B3***	173	190	177	.....	196	9.00	9.675
Joliet, Ill. *A5*	173	187	.....	212	193	9.00	9.55
Kokomo *C9**	175	189	.....	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	.....	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
SparrowsPt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

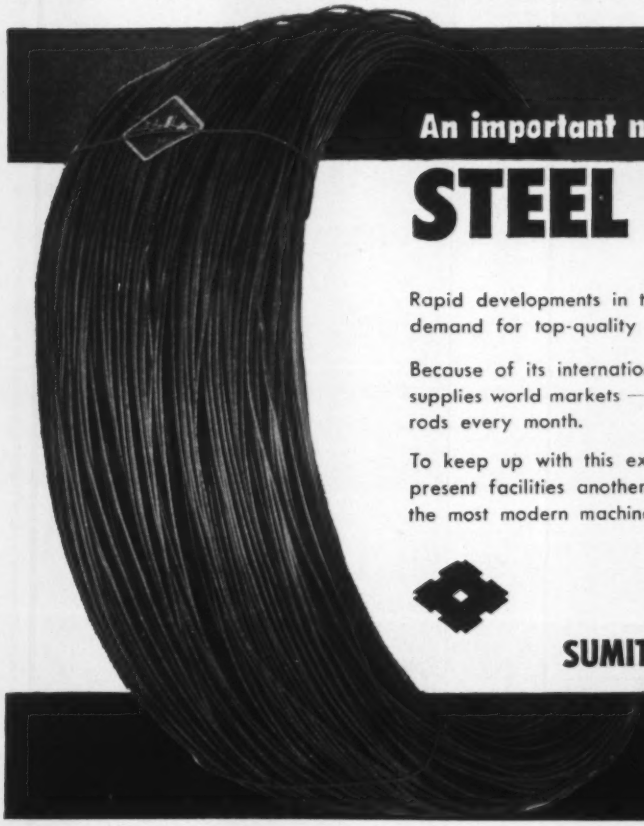
CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

	Net-Ton
Furnace, beehive (f.o.b.)	
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville, Is., Pa.	30.75



An important message for the man who buys

STEEL WIRE RODS

Rapid developments in the wire-product field have increased industry's demand for top-quality steel wire rods.

Because of its international reputation for reliability, Sumitomo Metal supplies world markets — America in particular — with 7,000 tons of wire rods every month.

To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.

LEADING PRODUCERS OF STEEL WIRE RODS, PIPE AND ROLLING STOCK PARTS

SUMITOMO METAL INDUSTRIES, LTD.

HEAD OFFICE: OSAKA, JAPAN
CABLE ADDRESS: "SUMITOMOMETAL OSAKA"

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	32.75
0.05% C....	33.50	1.00% C....	32.50
0.10% C....	33.25	1.50% C....	32.25
0.20% C....	33.00	2.00% C....	32.00

4.00-4.50% C, 60-70% Cr, 1.2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 31.50
5-7% C, 61-65% Cr, 5-8% Si 22.00
5% max C, 50-55% Cr, 2% max Si.. 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	24.50	14.60
Ton lots	29.75	16.05
Less ton lots	31.35	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19% ..	$98.00	$96.00	$100.50
19-21% ..	100.00	98.00	102.50
21-23% ..	102.50	100.50	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C.	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective June 20, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy

35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.

Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots. F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

GOSS and DE LEEUW

MULTIPLE SPINDLE

CHUCKING MACHINES

Tool Rotating

GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

FERRO-COLUMBIUM

Consult Us For Your Requirements

TRANSITION METALS & CHEMICALS, INC.

WALLKILL NEW YORK

ARMSTRONG T-SLOT CLAMPS

Make rigid set-ups in minutes on planers, drill presses, milling machines or other T-slotted beds or platens. Clamp slides or rotates to position on anchoring T-slot bolt. Drop forged, heat-treated body. Heat-treated screw has V-slotted swivel cap.

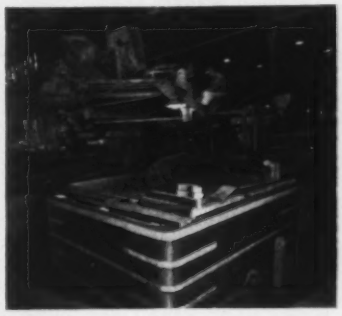
Write for Bulletin SUT

ARMSTRONG BROS. TOOL CO.

5209 Armstrong Ave., Chicago 46, U.S.A.

KUTZTOWN *Skill*

creates DUCTILE CAST IRON WATER BOXES



Recently we cast, what we believe to be, four of the largest Ductile Cast Iron Water Boxes for a power plant. The inside dimensions of the castings were 115" x 115" x 81" high. The outlet flanges are 80¾" OD x 66" ID and 2" thick. The casting weighed 26,330 pounds.

In our foundry we use a modern B & P Motive Speedslinger (pictured here) to ram many of our molds. By so doing, we are assured of clean surfaces and dimensional accuracy. Here we also see the partially completed mold and fin pattern for the ductile cast iron water boxes.

WE INVITE YOUR INQUIRIES. Our technical knowledge and our long experience with Ductile Iron may help you!

SEE OUR AD IN CHEMICAL ENGINEERING CATALOG—PAGE 423

We'll be happy to place your name on the mailing list to receive regular issues of the "Kutztown REVIEW."

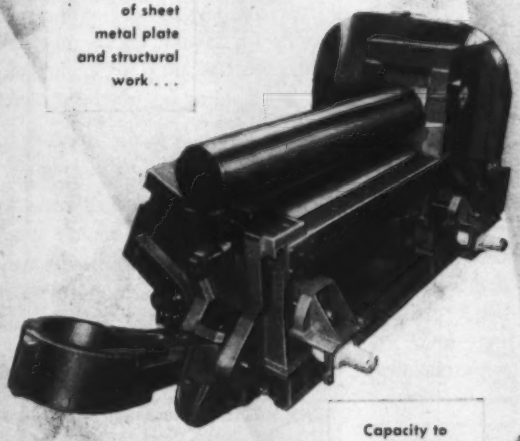
GRAY IRON • PRESSURE IRON • HIGH TENSILE IRON • LO-ALLOY IRON • NI-RESIST • NI-RESIST DUCTILE IRON • DUCTILE IRON

KUTZTOWN FOUNDRY & MACHINE CORP.

KUTZTOWN 41, PENNSYLVANIA

Our Line

Light and heavy machinery for all classes of sheet metal plate and structural work . . .



Capacity to 6 inch plate cold

THE LARGEST EVER BUILT

ORGANIZED 1879. INCORPORATED 1911

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CAMBRIDGE CITY INDIANA

DYKEM STEEL BLUE

Stops Losses making Dies and Templates

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench: metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

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2303G North 11th St. • St. Louis 6, Mo.

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CAP SCREWS • SET SCREWS • MILLED STUDS

CUSTOM SCREW MACHINE SPECIALTIES

*Wm. H. Ottemiller Co.

YORK, PENNSYLVANIA

CUT SCRAPER TIME

END NIGHT CLEANUP & MORNING REBLUING

DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.

THE DYKEM CO., 2303-G NORTH 11TH ST., ST. LOUIS 6, MO.

GUARANTEED—RE-NU-BILT

Electric Power Equipment — A. C. Motors

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1750	G.E.	M-579BS	4800	1800
1	1500	G.E.	MT	6600	1187
1	800	Whse.	CW	500	1776
1	800	G.E.	MT-428	2200	450
1	600	Whse.	CW	220/440	900
1	600	Whse.	CW-4-32D-15	440	1778
1	550	Whse.	CW	440	252
1	500	Whse.	CW	550	350
1	300	A.C.	ANY	440/2300	720
1	300	G.E.	MTP561	2200	1800
1	250	G.E.	IM-16	220/440	875
1	250	A.C.	ANY	550	600
1	250	Cr.Wh.	Size 29Q	2300	350
1	250	G.E.	MT-424Y	4000	257
1	200	G.E.	IE-13B	220	1800
2	200	Whse.	CW-890	2300	1775
1	200	G.E.	IM	440	435
1	150	G.E.	IM-17	440	435
1	200	G.E.	IM	2200	580
1	125	G.E.	MT-557	220/440	1200
3	100	A.C.		440	695

SQUIRREL CAGE

1	500	G.E.	FT-559AY	2200	3600
2	500	Whse.	CSP-583H	440	3600
1	500	Whse.	CS-1115	2200	863/445
4	500	Whse.	CS-1216	2200	500
2	450	Ell.	F-3910	2200	1200
1	400	Whse.	CS-7151 610H	6600/4000	3585
1	300	Whse.	CS-1002	2300/440	600
1	250	Whse.	CS-875S	2200	1775
1	200	Whse.	CSP-581S	449	3450
2	200	Whse.	CS-855S D.P.	220/440	1750
1	200	Whse.	CS-873C	2200	1160
1	150	G.E.	FT-558	2200	875
1	150	Whse.	CS	440	580
1	125	Whse.	CS-764C	220/440	1160
3	100	Whse.	CS-760C	2200/440	1100
1	100	Whse.	B.B.CS-607-220/440		1780

SYNCHRONOUS

1	6000	G.E.	ATI.8	200/6600	600
1	3500	G.E.	TS 1.0	4600/2300/4000	360
2	1750	G.E.	ATI	2300	3600
1	700	G.E.	TS.8P.F.	2300	1200
1	400	G.E.	TS-7563S	2200	1200
2	350	G.E.	ATI 1.0P.F.	2300	150
1	325	G.E.	ATI 1.0P.F.	140	1800
2	300	El Mach.	BRKT	2200	1200

BELYEA COMPANY, Inc.

47 Howell Street, Jersey City 6, N. J.

Tel. OL 3-3334

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

SLIP RING MOTORS

3 Phase—60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1**	5000	Ideal	Mill	6600/4160	440
1**	2500	G.E.	Mill	2300	236
1**	2500	G.E.	Mill	6600/4160	257
1**	1800	Whse.	Mill	2300	252
1**	1750	Whse.	Mill	2300	234
1**	1500	Al.Ch.	Mill	2300	508
1**	1300	Al.Ch.	Mill	2300	353
1**	1200	Al.Ch.	Mill	2300	505
1**	900	Al.Ch.	Mill	2300	160
1*	700	Whse.	CW-1224A	2300	585
1	500	Al.Ch.	ANY	2300	1175
1	500	Ideal	S-4-20	4800	708
1*	500	Al.Ch.	ANY	2200	505
1**	500	Al.Ch.	ANY	2200	293
1*	400	Al.Ch.	ANY	2300	505
1	400	Whse.	CW	2300	290
3	350	G.E.	I-M	2200	1180
1	300	G.E.	IE-15B	440	1200
1	300	Whse.	CW-1012	2200	704
1	250	Whse.	CW	4100/2400	710
1	250	Cr.Wh.	SR size Q	4600/2300	350
1	250	G.E.	MT-414	2200	300

**—Heavy duty, pedestal bearing, stator shifting bases.

*—Heavy duty, pedestal bearing, standard base.

OUTDOOR CIRCUIT BREAKERS

(Air—3-Pole)

Qu.	Amps.	KV	Make	Type	Int.	Cap.
3	1200	14.4	G.E.	ARA	1000	M.V.A.
2	1200	5	G.E.	AM	100	M.V.A.

(Oil—3-Pole)

1	400	73	Whse.	G-11	500	M.V.A.
1	600	69	G.E.	FK-339	500	M.V.A.
1	600	37	G.E.	FHKO-236	500	M.V.A.
1	400	37	G.E.	FHKO-136	250	M.V.A.
1	600	34.5	Al.Ch.	FZO-50-34X	250	M.F.A.
1	600	7.2	G.E.	FKO-227	50	M.V.A.

Transformer & Switchgear Package

3—833-KVA Allis-Chalmers Transformers, 1 ph., 60 cy., 13475/12375-11000/10175-V. Prim., 2300/4000-V. Secondary

1—G.E. Mag. outdoor O.C.B., type F.L.O., 600 amps., 14.4-KV, 250-MVA, Int. cap.

T. B. MAC CABE COMPANY

4302 Clarissa St., Philadelphia 40, Penna.

Cable Address "Macsteel" Philadelphia, Pa. Phone Davenport 4-8300

Ohio Sales Less Than Predicted

Used machine dealers in Ohio say business isn't up to expectations and the outlook for the year isn't too optimistic.

Prices are off on almost all items and auctions are bringing prices far below those of a year ago.

■ Outlook for used machinery in Ohio is only fair for this year—and far under most earlier expectations. Like a good many metalworking industries, machinery dealers hoped that in the wake of the steel strike, their business would take the same course and head for the moon.

As it is now, sales will probably end up at about the same level as last year, which wasn't an especially good or bad year.

Auction Prices Off—Auctions of used machinery are generally a good indicator of how dealers in the business view the future. And in a recent auction at Indianapolis prices of the machines offered came out far under levels of a few years ago.

A single-spindle, Type 3620 kellering machine sold for under $4000. Two years ago the same machines were being sold for $14,000. New replacement cost is about $32,900. Machines like this have a horizontal table travel of 36 in., a vertical travel of 20 in. and work in three dimensions. A large 1953 model, two-spindle kellering machine worth $100,000 new was sold for about $38,000 although in top condition.

Slower Pace—In the Cleveland area, conditions are possibly even a little slower than elsewhere.

"We simply haven't any real hot industry at the moment like electronics or missiles to hook onto to give us a spurt," says Elmer W. Pfeil, a leading local dealer. "Our big industries here are steel, autos and fabricating, none of which expect to break any records this year. Firms are simply not putting out money for capital goods now until things start to pick up again. Most are just holding off for the present."

Homebuilding Helps—One favorable trend mentioned by Mr. Pfeil is a continuing expansion of brass and aluminum fabricating plants to turn out home building products. Several have sprung up in Ohio and nearby areas.

As part of the operation they install used non-ferrous or steel rolling mills for sheet in sizes from about 16 in. to about 24 in. On these they turn out items like aluminum siding, shingles, roofing and other flat rolled products.

The national listing service of the Machinery Dealers National Assn. installed a few years ago is now carrying a listing of about 1000 machines available across the country. About 250 or 300 machines from it have been sold although no compilation is made of how many were sold directly through the service. Because of its success, several additional machinery dealers have joined the group.

About the only used machinery item in the Northeastern Ohio area with a steady demand now are large shears and press brakes in 8 to 10 ft sizes. Selection of available machines is the best in years.

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USED and RECONDITIONED

RAILWAY CARS and REPAIR PARTS

FLAT CARS

4—50-Ton Capacity, 43' long
Steel Underframe

30—Used, All-Steel
30-Cubic Yard, 50-Ton Capacity
MAGOR AIR DUMP CARS
Excellent Condition—Immediate Delivery

DIESEL-ELECTRIC LOCOMOTIVES
1, G. E. 25-Ton, 150 H.P., Std. Ga.
3, G. E. 44-Ton, 400 H.P., Std. Ga.
1, G. E. 80-Ton, 500 H.P., Std. Ga.
1, 125-Ton RAILROAD TRACK SCALE

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1—3-HIGH PLATE MILL 40" & 26½" x 112".
1—32" & 20" x 110" PLATE MILL, 3-high.
1—25" & 42" x 66" HOT STRIP MILL, 4-high.
1—3½" & 8½" x 5½" STRIP MILL, 4-high.
2—28" 3-HIGH ROLL STANDS.
1—18" 3-HIGH BAR MILL, single stand.
1—NEW 16" BAR MILL, 3-high, single stand.
1—10" BAR MILL with motor and gear drive.
1—9" BAR MILL 3-high, five stands.
1—34" x 192" ROLL GRINDER.
1—450 TON DOWN-CUT CROP SHEAR, 14" stroke, length of knives 28".
1—OPEN SIDE BAR SHEAR, Williams & White No. 14½, 1¾" round.
1—SHEAR, 1" x 110" plates.
1—LEVELLER, 1" x 104" plates.
1—ELECTRIC MELTING FURNACE, 1-ton capacity, 800 KVA transformer.
1—ROLL LATHE, ENCLOSED HEADSTOCK, up to 36" dia. rolls.
1—MAGNETIC SEPARATOR double pulley, Stearns.
1—SIDE TRIMMER, Streine, maximum width 48" makes 2 cuts 3/16" mild steel.
1—60" BACKED-UP ROLLER LEVELLER, work rolls 1½" dia.
1—HALLDEN STRAIGHTENING and cutting-off machine, capacity .562" brass rod.
1—POINTER, tube 2" O.D. x ¼" wall maximum.
1—1500 HP GEAR DRIVE, 7.5 to 1 ratio.
1—1200 HP GEAR DRIVE, 295 to 30 RPM.
1—1200 HP GEAR DRIVE, 353 to 94.5 RPM.
1—600 HP GEAR DRIVE, 1,698 to 1.
1—400 HP GEAR DRIVE, 8.2 to 1.
1—600 HP MOTOR, 2300/4600 volts, 3 phase, 60 cycle, 450 RPM.
1—400 HP MOTOR, 440 volts, 3 phase, 60 cycle, 450 RPM.
1—400 HP MOTOR, 2300/4600 volts, 3 phase, 60 cycle, 450 RPM.

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atmosphere-controlled with 9 bases, are available. Each is approximately 7' x 7' x 14'. Excellent when used for manufacture of steel coils, they have a capacity of 50 tons per charge. These top-grade furnaces are still set up in the plant. Tremendous values specially priced for prompt sale.

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2—General Electric Controlled Atmosphere Annealing, Stress Relief or Heat Treating Furnaces offered before removal from location at a small fraction of new cost. Both new 1952

#1—G. E. Electric 2150° w/4000 cfh generator, 2 circuits 245 KW ea, 95" x 12' car top, 13800 V. to 220 V. Pyranol Transformer.

#2—G. E. Electric 1950° w/2000 cfh generator 6'-5" x 16' x 4'-10" high, car 13800-220 V. Pyranol Transformer, panel.

Both of these units are complete, still in place, original location, each has complete control, Beck Program controller, car spotter, extra car, air circuit breaker, panels, elevator, etc. May be seen in place.

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Will Lease or Furnish Long Terms

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Surplus Equipment & Inventories Purchased

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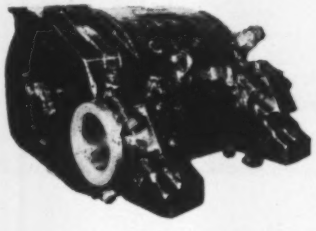
WESTINGHOUSE TRACTION MOTORS

New — In Original Crates



Westinghouse type 970-A; part No. 1296204. Max. HP: intermittent—400 HP @ 550 volts—650 amps. Continuous, with blower—300 HP @ 308 volts—325 amps. Max volts 550 DC — max amps 650 — max RPM 2000. 4-Pole series motors. Cooling: Can be force ventilated with small centrifugal fans. Air required, 1400 CFM @ 1.3" static pressure. Originally designed for Whitcomb 65-ton diesel electric locomotive.

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GEAR GRINDING MACHINES

6x20" Fitchburg Hydraulic Spline & Gear, m.d.
GG19 Gear Grinding, m.d., latest
GG31 Gear Grinding, internal geared & spline grinder, m.d.
15" National Broach Red Ring Gear Lapper, m.d.
18" National Broach Red Ring Gear Lapper, m.d.
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No. 17 Gleason Hypoid Grinder, m.d.

GEAR SHAPERS

Type Z Fellows Horizontal, m.d.
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No. 12 Fellows Gear Shaving Machine, m.d., late
No. 7 Fellows, 1945
No. 7, 7A Fellows, belted m.d.
No. 18 Fellows Gear Finishing Machine, m.d.
No. 61A Fellows, m.d., latest type, 1945
No. 645A3 Fellows, vee belt drive
No. 645Y Fellows, m.d.
No. 60 Cross Gear Tooth Rounder or Pointing Machine, m.d.
No. 70 Cross Deburring Machine, m.d., 1940
No. 72 Fellows H.S. Spur Gear, m.d.
No. 75 Fellows, H.S., m.d.
No. 75A Fellows H.S. Spur & Helical, m.d.
No. 712 Fellows, m.d.
No. 725 Fellows, 1945
No. 725A Fellows, H.S., m.d.

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No.12 Gleason Straight Tooth Bevel Gear Rougher, m.d.
No. 36 Gould & Eberhardt Bevel & Spur Gear Rougher, m.d.
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3" Gleason Gear Generator, m.d.
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No. 5AC Lees-Bradner Heavy Type Gear Generator, m.d.
No. 4-48" Brown & Sharpe, m.d.
No. 50 Cross Clutch Miller, m.d.
No. 5-60" Brown & Sharpe Gear Cutter, m.d.
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NEW G.E. A.C. MOTORS

FOR HYDRAULIC PUMPS OR HYDRAULICALLY DRIVEN DECK MACHINERY OR CRANES

New, as removed from U. S. Naval vessel Hawaii.

ALL A.C. 440/3/60

10 HP Continuous—40 HP intermittent ½ hour. High slip, high torque, induction, type KR. 2 available.
10 HP Continuous—40 HP intermittent ½ hour. 1040/520 RPM. 1 available.
(The above two motors have magnetic brakes.)
15 HP Continuous—60 HP intermittent ½ hour. 1770 R-M—type KF
20 HP Continuous—1770 RPM—type KF.
40 HP Continuous—wound rotor—440/3/60—635 RPM. Type M. 1 available.
18¾ HP Continuous—75 HP intermittent ½ hour. 1775 RPM, type KF. 2 available.

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1—3" Rd. Cap. Open End Vertical Bar Shear

1—2¾" Cap. Buffalo Billet Shear

1—10" Dia. x 20" Face 3-Hi Experimental Mill with 35 H.P. Motor.

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LECTROMELT—SIZE "S"
1000#/Hr. Rating Door Charge, 500 KVA Transformer, 25000 V Primary, Controls, Switchgear and Spares.

LECTROMELT—SIZE "U"
250#/Hr. Rating Door Charge, 300 KVA Transformer, 25000 V Primary, Controls, Switchgear and Spares.

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c/o The IRON AGE, Chestnut at 56th, Phila. 39

OVER 1,000 NEW AND USED MACHINE TOOLS IN STOCK
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STEAM DROP

(2) MODEL E CHAMBERSBURG
2,000# Capacity
New 1943 — Excellent Condition
IMMEDIATE DELIVERY

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MACHINES FOR YOUR YARD
Amer. 50B 3 drum hoist w/slewer
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Jeep trencher
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Shovel front for 77B 1½ yd. w/PM bucket

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5' x 12 Ga. Whitney Power Shear.
No. 3 Niagara Angle Bending Roll, M.D.
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No. ½, No. 1½ Buffalo Univ. Ironworkers, M.D.
500 Ton Southwark Hyd. Inclined Wheel Press.
6' x ¼" Lawn Initial Bending Roll, M.D.

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UPSETTERS—
National Air Clutch, 1½", 2", 4"

HAMMERS—
Two 1,000 lb. Chambersburg Model J-2 Board Drop
3,000 lb. Chambersburg Ceco Drop Air Lift, practically new
2500 lb. Model F Board Drop
3500 lb. Erie Double Frame Steam Forging Hammer

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For Sale
UNITED ROLLING MILL
26" x 54" with 20" necks. 100 hp—220 3 ph., 60 cy. motor and Cleveland gear reducer.

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AXIAL FLOW FANS

From unfinished Battle Cruiser "Hawaii"

All New! Installed
but never run!

RELIANCE MOTORS—ALL 440/3/60

22580 CFM @ 3.4" static pressure; 25 HP @ 1760 RPM—39" ID top; 54" bottom; 40" long.
18310 CFM @ 3" static pressure; 15 HP @ 1760 RPM — 36" ID both ends; 36" long.
17750 CFM @ 3" static pressure; 15 HP @ 1760 RPM—35½" ID both ends; 36" long.
17475 CFM @ 3¼" static pressure; 15 HP @ 1760 RPM—36" ID both ends; 36" long.
17040 CFM @ 4" static pressure; 17½ HP @ 1755 RPM—36" ID top; 51" OD bottom; 57" long.
16065 CFM @ 4.2" static pressure; 15 HP @ 1760 RPM—36" ID top; 51" OD bottom; 37" long.
16000 CFM @ 3.7" static pressure; 15 HP @ 1750 RPM—36" ID top & bottom; 37" long.
15840 CFM @ 3.4" static pressure; 15 HP @ 1760 RPM—36" ID top; 51" OD bottom; 37" long.
15320 CFM @ 4" static pressure; 15 HP @ 1760 RPM—36" ID top; 51" OD bottom; 37" long.
13815 CFM @ 3¾" static pressure; 12½ HP @ 1760 RPM—34" ID both ends; 37" long.
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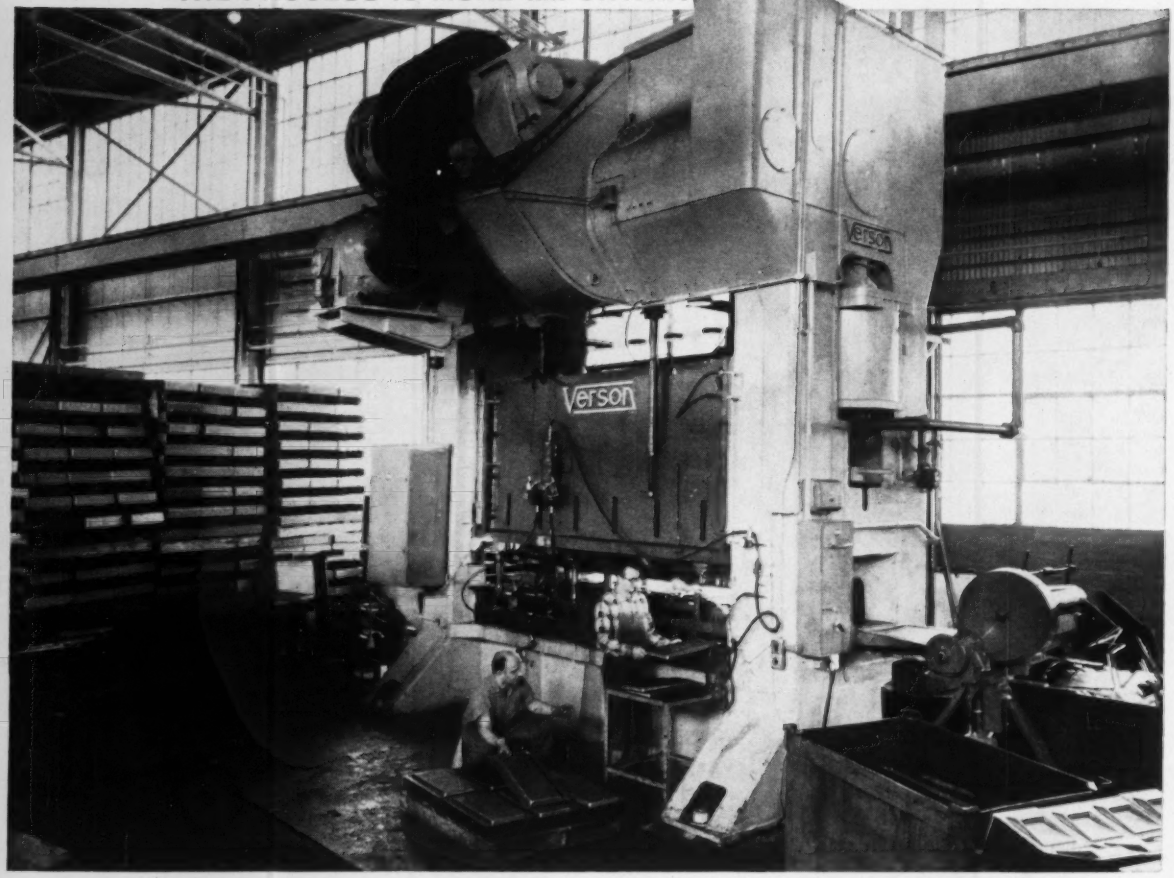

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